MERGE 56 DEVELOPMENT PROJECT

SAN DIEGO, CALIFORNIA

FINAL ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDICES H-K

SCH NO. 2014071065

PROJECT NO. 360009

DECEMBER 2017

Prepared for:

City of San Diego
Development Services Department
Land Development Review
1222 First Avenue, MS 501
San Diego, CA 92101-4155

APPENDIX H

Geotechnical Reports

GEOTECHNICAL INVESTIGATION

RHODES PROPERTY
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
CONSULTANTS

PREPARED FOR

RHODES PROPERTIES

EL CAJON, CALIFORNIA

JULY 1998

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS

Project No. 06021-52-01
July 2, 1998

Rhodes Properties
1934 Estela Drive
El Cajon, California 92020

Attention: Mr. Keith Rhodes

Subject: RHODES PROPERTY
SAN DIEGO, CALIFORNIA
GEOTECHNICAL INVESTIGATION

Dear Mr. Rhodes:

In accordance with the authorization of our proposal dated September 19, 1997, we have performed a geotechnical investigation for the subject site located in the northern limits of the city of San Diego, California. The accompanying report presents the results of our study and our conclusions and recommendations pertaining to the geotechnical aspects of developing the site as proposed.

In our opinion the site may be developed as planned provided the recommendations of this report are followed. The information provided herein should be updated as specific grading and building plans are developed. If you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

David F. Leake
RCE 22527

DAVID F. LEAKE
No. 22527
Exp. 12/31/01

David B. Evans
CEG 1860

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3/31/00

DBE:DFL:dmc

(6/del) Addressee
(2/del) Latitude 33
Attention: Mr. John Eardensohn

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the findings from a geotechnical investigation of the proposed Rhodes Property project located in the future urbanizing area (Subarea IV) of San Diego, California (see Vicinity Map, Figure 1). The purpose of the study was to investigate the soil and geologic conditions at the site, as well as geotechnical constraints (if any), that may impact areas of proposed development. This report provides recommendations relative to the geotechnical engineering aspects of developing the project as proposed based on the conditions encountered during this investigation and a previous geologic reconnaissance study. The information contained herein should be updated as specific grading plans are developed.

The scope of the investigation included a review of aerial photographs, readily available published and unpublished geologic literature and a previous geologic reconnaissance report for the overall future urbanizing area, Subarea IV property. Pertinent information from the reconnaissance study has been incorporated into this report. The scope also included performing a field investigation, laboratory testing to identify physical soil properties, engineering analyses and preparation of this report.

The field investigation was conducted on December 19 and 29, 1997, and consisted of a site reconnaissance by an engineering geologist, drilling 5 large-diameter borings, and excavating 17 trenches. The large diameter borings were excavated to examine the soil and geologic units within areas of anticipated cut and cut slopes and to identify geologic contacts. The exploratory trenches were performed to determine the general extent of surficial deposits (i.e., topsoil, colluvium, alluvium, landslides), and to supplement the drilling program by further investigating geologic conditions where development is anticipated. Details of the field investigation as well as descriptive boring and trench logs are presented in Appendix A.

Laboratory tests were performed on selected representative soil samples obtained during the field investigation to evaluate the pertinent physical properties of the soil conditions encountered. The laboratory information was used in engineering analyses and to assist in providing recommendations for site grading and development. Details of the laboratory tests and a summary of the test results are presented in Appendix B.

As part of this study, the following information was reviewed:

1. Plans
2. *Final Report Of Testing And Observation Services During Site Grading,, Villa Panacea,* prepared by Geocon, Incorporated, dated May 29, 1997, revise date June 26, 1997.
3. *Update Soil and Geologic Investigation (for) Park View Estates Unit 1 (Villa Panacea) San Diego, California*, February 23, 1996.
4. *City of San Diego, Seismic Safety Study, Geologic Hazards And Faults*, sheet 39 and 43, Development Services Department, 1995 edition.
5. *Landslide Hazards In The Northern Part of The San Diego Metropolitan Area, San Diego County, California,* California Division Of Mines And Geology, Open File Report 95-04 (1995).
6. *Soil And Geologic Reconnaissance For Future Urbanizing Area - Subarea IV Property, San Diego, California,* prepared by Geocon, Incorporated, dated May 10, 1993.
7. *Preliminary Fault Activity Map Of California, C*alifornia Division Of Mines And Geology, Open File report 92-03, 1992.
8. *Soil And Geologic Reconnaissance For Black Mountain Ranch, San Diego, California,* prepared by Geocon Incorporated, dated March 10, 1992.
9. U.S. Geological Survey, 1967, Delmar, California, *7.5 Minute Quadrangle Map,* photorevised 1975.
10. *Geology of The San Diego Metropolitan Area, California,* California Division Of Mines And Geology, Bulletin 200 (1975).
11. Weber Jr., F. Harold, *Geology and Mineral Resources of San Diego County, California*, California Division of Mines and Geology (County Report 3), 1963.
12. 1953 stereoscopic aerial photographs of the subject site and surrounding areas (AXN-3M-180 and 181).
13. In-house maps and records recorded during construction of Villa Panacea.

The base map used to depict the soil and geologic conditions consisted of a reproducible copy of the undated, untitled plan for Torrey Highlands/Penasquitos East, scale 1 inch equal to 100 feet, prepared by Latitude 33 (see Geologic Map, Figure 2). The map depicts the configuration of the property, conceptual development, existing topography, mapped geologic contacts and the approximate locations of the exploratory excavations. The conclusions and recommendations presented herein are based on an analysis of the data obtained from the exploratory field investigation, laboratory tests, and experience with similar soil and geologic conditions.

2. SITE AND PROJECT DESCRIPTION

The generally rectangular, “L-shaped” property consists of approximately 130 acres of undeveloped land located at the boundary of Rancho Penasquitos and the North City Future Urbanizing Area, Subarea IV. (see Vicinity Map, Figure 1). Specifically, the site is north of Eclipse Road (Vista Allegre), south of Sundance Avenue, and west of Abing Avenue and the Villa Panacea project which is currently under construction. Existing Carmel Mountain Road crosses the northeastern portion of the site and provides access to Via Panacea whereas proposed Ted Williams Freeway (State Highway 56) bisects the northern project area. Topographically, the site is characterized by mesas dissected by several moderately steep-sided canyons trending generally westward. Two small east to southeast trending drainages are located in the south and east portions of the property. The network of tributaries at the site convey runoff into Deer Canyon and Penasquitos Canyon which ultimately drain to the west.

Natural slope gradients range from nearly horizontal in the mesa areas to approximately 1½:1 (horizontal:vertical) along the steeply incised canyon located in the southern portion of the site. Some near vertical topographic exposures are present in the west central region of the property where prior grading has occurred. The highest elevation on the site is approximately 420 feet Mean Sea Level (MSL) and the lowest elevation is approximately 310 feet MSL. Vegetation consists primarily of a sparse to dense growth of chaparral, Coastal Sage Scrub, and some trees along the main drainages. Man-made features observed consist of mined areas and a network of dirt roads associated with agriculture and off-road activity.

A review of the conceptual plan (Reference No. 1) indicates that site development will include a shopping center, multifamily residential, and single-family detached residential uses. Excluding the grading necessary for Highway 56, cut slopes will be less than 20 feet high. Maximum fill slope heights occur along the perimeter of the project where they are approximately 70 feet. Fill slopes within the interior of the development are generally less than 20 feet. Grading for Highway 56 will result in cut and fill slope heights of 50 feet and 70 feet, respectively. It is anticipated that all major slopes will be inclined at 2:1 (horizontal:vertical), or flatter.

The locations and descriptions of the site and proposed development are based on a site reconnaissance, a review of the conceptual grading plan (Reference No. 1), and our general understanding of the project as presently proposed. Once the final grading plans are developed, Geocon Incorporated should be notified to review the plans and evaluate the need for additional study and/or possible revision to this report

3. SOIL AND GEOLOGIC CONDITIONS

Six surficial soil types and two geologic formations were encountered during the field investigation. One undifferentiated formation was subdivided into two facies. The surficial soil deposits consist of compacted fill, undocumented fill, topsoil, colluvium, alluvium, and shalow landslide deposits. Formational units include the Quaternary-age Lindavista Formation and Eocene-age Stadium Conglomerate/Mission Valley Formation (undifferentiated). Each of the surficial soil types and geologic units encountered is described below in order of increasing age. Their estimated extent is shown on the Geologic Map, Figure 2 (map pocket).

3.1. Compacted Fill (Qcf)

Compacted fill embankments associated with the construction of Carmel Mountain Road Stations 34 through 53, and Via Las Lenas, are present in the northeastern portion of the property. The roadways were constructed during mass grading operations for Villa Panacea and provide the primary access to the project. Testing and observation services performed during placement of the fills were provided by Geocon, Incorporated and the compaction test results and a description of the grading operation are presented in Reference No. 2.

The fill materials were derived from cuts within the southern extension of the alignment (approximate Stations 34 through 42) and consist primarily of silty to clayey sands. With the exception of the outermost portions of the exposed fill areas which may be saturated from landscape irrigation, compacted fills should be suitable for support of structural loads in their present condition. Normal benching and mixing procedures, as proposed embankments are joined to the existing fills, will likely provide adequate mitigation of potentially saturated surface soils.

3.2. Undocumented Fill (Qudf)

Undocumented fills are present in the northeast corner of the site and in tributary drainages along the western property margin. The fill in the northeastern corner of the property is associated with construction of Sundance Avenue and Abing Avenue whereas the fills along the western boundary are presumably from prior borrow operations. It is possible that documentation exists for the road fill embankments, however, research to locate these documents was beyond the scope of this study.

The presence of modified topography as well as visible soil layers, organic lenses and barb wire in Trench Nos. T7, T9, T10, T11, and T12 suggests that the low-lying areas of the western portion of the site was used as a borrow/fill area where alluvial soils were removed from the drainages and replaced with undocumented fill. Due to the difficulty in identifying and differentiating the limits between undocumented fills and alluvium in this area, these deposits have been combined on the geologic map, Figure 2.

Where encountered, undocumented fill deposits in the drainage areas consisted of loose, dry to damp, silty to clayey sands and gravel/gobble with visible layers, root lenses and root pockets. The maximum thickness of undocumented fill observed was 9 feet in Trench Nos. T7 and T11. Localized areas may be thicker where natural topographic depressions were infilled during prior grading operations. With the possible exception of the Sundance/Abing Avenue roadway embankment in the northeastern corner of the site, the undocumented fill deposits are likely compressible and will require removal and compaction in areas of proposed development. The Sundance/Abing Avenue roadway embankment will require further evaluation during future studies.

3.3. Topsoil (Unmapped)

Topsoils blanket the majority of the site and vary in thickness from approximately 1 to 2½ feet. The topsoils are characterized as stiff, moist to very moist, brown, sandy clays and clayey sands and loose silty sands. Topsoil deposits will require removal and compaction in areas planned to receive structural fill and/or settlement sensitive structures. The clayey topsoils likely possess a medium to high expansion potential and should be placed in deeper fill areas and generally at least 15 feet from the face of slopes. Expansion Index testing during this study indicates that the sandy topsoil deposits (B3-1) possess a low expansion potential.

3.4. Colluvium (Qcol)

Colluvial deposits were encountered in Trench No. T6 and are presumed to be present in the gentle, low lying, slope areas and in topographic depressions in several other areas of the property (see geologic Map, Figure 2). Where observed, colluvial deposits consisted of loose silty fine sand and stiff fine sandy clay underlain by medium dense clayey gravel/cobble with a thickness of approximately 4 feet. Thicker colluvial deposits may be present. These deposits generally possess medium to high expansion potential, are poorly consolidated and will require remedial grading in areas of planned development.

3.5. Alluvium (Qal)

Alluvial soils are present within the drainages that cross the property and as previously noted have not been differentiated from undocumented fill deposits in the western portion of the site. The alluvial deposits generally consist of loose/soft, damp to saturated, silty/clayey sands and sandy clays with varying amounts of gravel and cobble derived from the bedrock units. The alluvial deposits are poorly consolidated, compressible, and will require remedial grading. The anticipated maximum depth of removal, based on the exploratory excavations, is approximately 13 feet (Trench No. T5). Groundwater should be anticipated when performing remedial grading in alluvium (Trench Nos. 3 and 5) especially if construction is planned during the winter months.

3.6. Shallow Landslide Deposits (Qls)

Two relatively minor shallow landslide deposits were encountered along the main east-west trending drainage in the northern portion of the site. These deposits occur along relatively gentle south and north facing slopes within the Stadium Conglomerate/Mission Valley Formation below an elevation of approximately 380 feet MSL. Although the materials encountered closely resembled thick colluvial deposits, some indications of shearing and disturbance in the slide mass as well as characteristic landslide morphology of a relatively steep back-scarp and areas of bulging, hummocky topography warranted this classification.

The landslide debris consisted primarily of soft/loose to very stiff/medium dense, moist to very moist, dark brown to grayish brown with orange mottling silty clay to clayey gravel. It is not anticipated that the shallow landslide deposits will significantly impact the project, however, the areas where these materials encroach into proposed development will require remedial grading in the form of complete removal and compaction prior to placement of fills and/or structural improvements. The maximum depth of remedial grading is anticipated to be on the order of 13 feet (Trench No. T1)

3.7. Lindavista Formation (Qln)

Dense, damp to moist, orange brown, silty to clayey sand and gravel/cobble, of the Lindavista Formation was encountered in all of the exploratory borings except Boring No. B3. It is presumed that the absence of this formation in the vicinity of Boring No. B3 resulted from localized weathering and/or erosion. The Lindavista Formation forms a characteristic resistant cap along the mesas. This unit is generally massive, horizontally bedded, and ranges in thickness from several feet to approximately 14 feet (Boring No. B2). It is common to encounter areas of highly cemented conglomerate within this unit that may require heavy ripping to facilitate excavation. Oversize rock chunks generated as a result of heavy ripping may be difficult to handle and will require special fill placement procedures.

3.8. Stadium Conglomerate/Mission Valley Formation (Undifferentiated, Tst/Tmv)

Geologic units identified as the Stadium Conglomerate and Mission Valley Formation were observed in surface outcrops, mining excavations and exploratory excavations beneath the Lindavista cap throughout the site. Reference No. 10 also indicates that the site is underlain by these geologic units.

The stratigraphy encountered suggests that interfingering between the Mission Valley Formation and Stadium Conglomerate occurs within the general vicinity of the site.

A light brown sandstone unit was observed in several areas of the property and was nearly identical to the sandstone matrix of the Stadium Conglomerate. At a similar elevation to the occurrence of these units, massive, light brown to light gray sandstones with some interbedded grayish-green claystone lenses (Boring Nos. B4, B3) resembling the Mission Valley Formation were encountered. Both of these units were interbedded with conglomerate lenses. The observations suggest that a transition between terrestrial (Stadium Conglomerate) and marine deposits (Mission Valley Formation) may occur in the area resulting in interfingering of the units.

For the purpose of this study the Stadium Conglomerate and Mission Valley Formation have not been mapped separately, however, further subsurface investigations may better define their relationship within the property boundary. During this investigation a conglomerate and sandstone facies within the Stadium Conglomerate/Mission Valley Formation unit was separated on the Geologic Map (Figure 2) based on the exploratory excavations, surface exposures, and topographic expression. The site topography appears to be characteristic of each of these facies' resistance to erosion.

The sandstone facies typically consists of dense, light brown to light gray, silty fine sandstone with occasional lenses of grayish-green claystone. The sandstone was often micaceous and well cemented. The conglomerate facies typically consists of dense to very dense, light brown to orange brown silty, fine to medium gravel/cobble conglomerate characteristic of the Stadium Conglomerate. Both geologic units, if free of claystone/siltstone lenses, should produce a significant quantity of "low" expansive sands suitable for fill slope construction and placement in the upper portion of building pads. Where the claystone/siltstone interbeds are absent, cut slopes with inclinations of 2:1 (horizontal:vertical) can be expected to possess adequate overall stability within these units.

The Stadium Conglomerate/Mission Valley Formation often exhibits highly cemented zones which may result in excavation difficulty during grading and excavations for site improvements (i.e., underground utility lines, building foundations, etc.). Although blasting is not anticipated, moderate to heavy ripping should be expected in portions of this formation to facilitate excavation. Generation of oversize materials requiring special handling and placement techniques should also be expected. Consideration should be given to undercutting cemented zones within the Stadium Conglomerate/Mission Valley Formation to reduce the potential for excavation difficulty during the construction of site improvements.

4. GROUNDWATER/SEEPAGE

Perched groundwater and/or seepage was encountered within alluvial drainage areas (Trench Nos. T3, T5, T12). Seepage conditions were also encountered within the Stadium Conglomerate/Mission Valley Formation (Boring No. B1). The groundwater/seepage in drainage courses is likely the result of surface runoff of rainfall or irrigation water from up-slope sources along the natural watershed. Subdrain systems will be necessary in areas of proposed development to intercept and convey seepage migrating along impervious strata. In particular, main drainages, and possibly where impervious layers daylight near the ultimate graded surface may require subdrains.

A static, near-surface groundwater table was not observed in the exploratory excavations. The existing perched ground water levels in alluvial areas, however, can be expected to fluctuate seasonally and may effect remedial grading. In this regard, remedial grading may encounter wet soils and excavation and compaction difficulty particularly if grading is planned during the winter months. It should also be noted that areas where perched water or seepage was not encountered may exhibit groundwater during rainy periods or after installation of landscape irrigation systems.

5. GEOLOGIC HAZARDS

5.1. Geologic Structure and Local Faulting

In general, measurements performed on bedding and geologic contacts suggest a near horizontal attitude of the geologic units on the site. The base of the Lindavista Formation, however, was found to dip slightly north to northeast within the property. It should be recognized that due to the limited number of structural features observed, a local structural trend within the site could not be inferred with certainty particularly where interfingering of the geologic units is occurring. Reference No. 10 suggests that the stratigraphic units are generally horizontal to dipping slightly southwest with the exception of the Lindavista terrace which is mapped as nearly horizontal.

Kennedy (Reference No. 10), and Reference No. 4, map a relatively short fault segment (one mile long) approximately 1600 feet northeast of the property generally trending toward the site. Several other smaller faults are shown to align with the site a further distance away. Exploratory trenching and drilling during this phase of investigation did not encounter evidence of faulting.

5.2. Regional Faulting and Seismicity

Based on a site reconnaissance, evidence obtained in the exploratory excavations, previous work by others, and a review of published geologic maps and reports, the site is not located on any known active or potentially active fault trace. The nearest known active fault is the northern extension of the

Rose Canyon Fault located approximately 9 miles to the west. Major earthquakes occurring on the Rose Canyon Fault, or other regional active faults located in the southern California area, could subject the site to moderate-to-severe ground shaking within the life span of the proposed structures.

The distance of known faults to the site was determined from the computer program EQFAULT (Blake, 1989a). A search radius of 62 miles was performed and 14 known active faults were identified. Principle references used by EQFAULT in selecting faults to be included were Jennings (1975), Anderson (1984) and Wesnousky (1986). The program EQFAULT was also used to estimate ground accelerations at the site for the maximum credible and maximum probable seismic events. Estimates of earthquake reoccurrence intervals were calculated based on the method of Campbell (1978). Attenuation relationships presented by Joyner and Boore (1982) were used to estimate site accelerations.

The results of the seismicity analyses indicate that the Rose Canyon Fault zone, the Offshore Zone of Deformation (OZD), and the Elsinore Fault Zone are the dominant sources of potential ground motion at the site. The Rose Canyon Fault Zone having a Maximum Credible (Upper Bound) Magnitude of 7.0 and Maximum Probable Magnitude of 5.9, respectively, is considered to be the source of the greatest seismic ground shaking within the property. The "maximum credible earthquake" is defined as the maximum earthquake that appears capable of occurring under the presently known tectonic framework, while the "maximum probable earthquake" is the maximum earthquake that is considered likely to occur during a 100-year time interval (California Division of Mines and Geology Notes, Number 43). The estimated maximum credible and maximum probable ground accelerations were determined to be approximately 0.25 g and 0.14 g, respectively.

The <u>effective</u> ground acceleration is the most significant and repeatable part of the ground motion that possesses strong energy content that is most likely to produce structural deformation (Newmark and Hall, 1982). It has been determined by Ploessel and Slosson (1974) that the effective ground acceleration is equal to approximately 65 to 70 percent of the peak ground acceleration for earthquakes occurring within 20 miles of a site. Earthquakes occurring at distances in excess of 20 miles are assumed to result in an effective ground acceleration equal to peak ground acceleration. Presented on the following table are the deterministic earthquake events for selected faults and <u>effective</u> site accelerations for the faults considered most likely to subject the site to ground shaking.

TABLE 5.2.

Fault Name	Distance From Site (miles)	Maximum Credible Event	Maximum Probable Event	Maximum Credible Effective Site Acceleration (g)	Maximum Probable Effective Site Acceleration (g)
Coronado Banks-Agua Blanca	23	7.5	6.7	0.09	0.06
Elsinore Fault	28	7.5	6.6	0.07	0.04
Rose Canyon Fault Zone	9	7.0	5.9	0.18	0.10
San Diego Trough-Bahia Sol.	32	7.5	6.2	0.06	0.03
Newport-Inglewood-Offshore	21	7.1	5.9	0.08	0.04

5.3. Ancient Landslides

The two relatively minor landslide areas were identified and can be readily mitigated by removing the deposits.

5.5. Liquefaction

Provided the remedial grading recommendations presented in the *Conclusions and Recommendations* portion of this report are followed and considering the lack of a near-surface, permanent, groundwater table, the potential for seismic-induced liquefaction occurring on the site is negligible.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. General

6.1.1. No soil or geologic conditions were encountered which would preclude the development of the property, as presently planned, provided the recommendations of this report are followed.

6.1.2. The surficial soils (undocumented fill, topsoil, colluvium, alluvium, and shallow landslide deposits) are not considered suitable for the support of fill or structural loads in their present condition and will require remedial grading in the form of removal and compaction.

6.2. Groundwater

6.2.1. Perched groundwater and/or seepage was encountered in several of the exploratory excavations. The most extensive occurrences of groundwater are anticipated in the drainage courses. It should be anticipated that remedial grading of surficial deposits in these areas will encounter wet materials and possible excavation and fill placement difficulties especially if grading is planned for the winter months.

6.3. Subdrains

6.3.1. The geologic units encountered have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to groundwater seepage. The use of canyon subdrains is recommended to mitigate the potential for adverse impacts associated with seepage conditions. Figures 3 through 5 depict typical canyon subdrain details. The estimated subdrain locations are depicted on Figure 2.

6.3.2. The final segment of subdrain should consist of non-perforated drain pipe. At the non-perforated/perforated interface, a seepage cutoff wall should be constructed on the downslope side of the junction in accordance with Figure 4. Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent head wall structure in accordance with Figure 5.

6.3.3. The final grading plans should show the location of all proposed subdrains. Upon completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map depicting the existing conditions.

6.4. Soil and Excavation Characteristics

6.4.1. The soil conditions encountered vary from low expansive, sandy gravel and cobble conglomerate and silty sands to highly expansive clayey topsoils, colluvium, landslide materials and limited lenses of claystones/siltstones within the Stadium Conglomerate/Mission Valley Formation. Portions of the Lindavista Formation and Stadium Conglomerate/Mission Valley Formation will likely require moderately heavy to heavy ripping due to the random occurrence of highly cemented zones. Oversize concretions and cemented chunks of conglomerate are often generated and will require special handling and placement in fill areas.

6.4.2. The surficial deposits may be very moist to saturated during the winter or early spring depending on preceding precipitation, and may require mixing with drier material or drying prior to their use as compacted fill.

6.5. Grading

6.5.1. All grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix C and the city of San Diego Grading Ordinance. Where the recommendations of Appendix C conflict with this report, the recommendations of this report should take precedence.

6.5.2. Prior to commencing grading, a preconstruction conference should be held at the site with the owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

6.5.3. Site preparation should begin with the removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soils to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site.

6.5.4. All potentially compressible surficial soils (undocumented fill, topsoils, colluvium, alluvium, and shallow landslide deposits) within areas of planned grading should be removed to firm natural ground and properly compacted prior to placing additional fill and/or structural loads. The actual extent of unsuitable soil removals should be determined in the field by the soil engineer and/or engineering geologist. Overly wet, surficial materials will require drying and/or mixing with drier soils to facilitate proper compaction.

6.5.5. The site should then be brought to final subgrade elevations with structural fill compacted in layers. In general, soils native to the site are suitable for re-use as fill if free from vegetation, debris and other deleterious material. Layers of fill should be no thicker than will allow for adequate bonding and compaction. All fill, including backfill and scarified ground surfaces, should be compacted to at least 90 percent of maximum dry density at approximately 2 percent over optimum moisture content, as determined in accordance with ASTM Test Procedure D 155791. Fill materials near and/or below optimum moisture content will require additional moisture conditioning prior to placing additional fill.

6.5.6. To reduce the potential for differential settlement, it is recommended that the cut portion of cut-fill transition building pads be undercut at least 3 feet and replaced with properly compacted "very low" to "low" expansive fill soils. Cut-fill transition areas within commercial building pads should be evaluated on an individual basis.

6.5.7. Cut pads exposing concretions or cemented material should be undercut at least 3 feet and replaced with properly compacted "very low" to "low" expansive soil.

6.5.8. Where practical, the upper 3 feet of all building pads (cut or fill) and 12 inches in pavement areas should be composed of properly compacted or undisturbed formational "very low" to "low" expansive soils. The more highly expansive fill soils should be placed in the deeper fill areas and properly compacted. "Very low" to "low" expansive soils are defined as those soils that have an Expansion Index of 50 or less when tested in accordance with UBC Table 18-I-B.

6.5.9. Cobbles or concretions greater than 12 inches in maximum dimension should not be placed within 10 feet of finish grade or 3 feet of the deepest utility. Cobbles and concretions greater than 6 inches in maximum dimension should not be placed within 3 feet of finish grade in building pad areas.

6.6. Slope Stability

6.6.1. Slope stability analysis utilizing average drained direct shear strength parameters based on laboratory tests and experience with similar soil types in nearby areas indicates that fill slopes up to at least 70 feet high, constructed of on-site granular materials derived from the Stadium Conglomerate/Mission Valley Formation, should have calculated factors of safety of at least 1.5 under static conditions for both deep-seated failure and shallow sloughing conditions. Cut slopes up to 70 feet high were also found to possess a calculated factor of safety in excess of 1.5 for a deep-seated failure condition provided they are free of adversely dipping weak strata, or bedding plane shear zones. Deep-seated slope stability and surficial slope stability calculations are presented on Figures 7 through 9.

6.6.2. It is recommended that all cut slope excavations be observed during grading by an engineering geologist to verify that soil and geologic conditions do not differ significantly from those anticipated.

6.6.3. The outer 15 feet (or a distance equal to the height of the slope, whichever is less) of fill slopes should be composed of properly compacted granular "soil" fill to reduce the potential for surficial sloughing. In general, soils with an Expansion Index of less than 90 or at least 35 percent sand size particles should be acceptable as "granular" fill. Soils of questionable strength to satisfy surficial stability should be tested in the laboratory for acceptable drained shear strength. Slopes should be compacted by backrolling with a loaded sheepsfoot roller at vertical intervals not to exceed 4 feet and should be track-walked at the completion of each slope such that the fill soils are uniformly compacted to at least 90 percent relative compaction to the face of the finished sloped.

6.6.4. All slopes should be landscaped with drought-tolerant vegetation, having variable root depths and requiring minimal landscape irrigation. In addition, all slopes should be drained and properly maintained to reduce erosion.

6.7. Earthwork Grading Factors

6.7.1. Estimates of embankment shrink-swell factors are based on comparing laboratory compaction tests with the density of the material in its natural state and experience with similar soil types. It should be emphasized that variations in natural soil density, as well as in compacted fill, render shrinkage value estimates very approximate. As an example, the contractor can compact fills to any relative compaction of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has at least a 10 percent range of control over the fill volume. Based on the work performed to date and considering the above discussion, the following earthwork factors may be used as a basis for estimating how much the on-site soils may shrink or swell when removed from their natural state and placed in compacted fills.

TABLE 6.7.

Soils Unit	Shrink-Swell Factors
Undocumented fill, Topsoils, Colluvium, Alluvium, Landslide Deposits	5 Percent Shrinkage
Lindavista Formation or Stadium Conglomerate/Mission Valley Formation	3 to 7 Percent Bulk

6.8. Terrace Drains

6.8.1. The use of terrace drains on cut or fill slopes exceeding 30 feet in height is not considered necessary to maintain gross stability of the slopes. Based on past experience with similar projects, properly-constructed and maintained terrace drains may reduce slope erosion, particularly on fill slopes. However, improperly-maintained terrace drains can result in significant slope erosion and possible slope distress. Terrace drains which are allowed to fill with debris may concentrate surface runoff down the slope face, resulting in deep, extensive erosion gullies. It is therefore recommended that the use of terrace drains planned for cut or fill slopes on the project be kept to a minimum, consistent with the general guidelines which follow.

6.8.2. For cut or fill slopes above developed lots, a terrace drain should be provided no higher than 30 feet above the toe of slope or alternatively a lined surface drain may be located along the toe of slope.

6.8.3. For cut or fill slopes above streets or non-building areas, terrace drains are not required.

6.8.4. All terrace drains should direct the flow of water into storm drains or other suitable drainage facilities. For "daylight" canyon fills, down-drains should be provided at the contact between fill and natural materials, to reduce erosion along the contact.

6.8.5. The above recommendations are presented as general guidelines only; other considerations may dictate the design of slope terrace drains. All terrace drains should be sized to accommodate the maximum flow of water anticipated from the drainage area above, under the design rainfall event.

6.8.6. It is recommended that terrace drains be constructed at a drainage gradient of at least 2 percent, and steeper, where practical. In addition, a maintenance program should be devised and followed, which clearly designates the persons or agencies responsible for maintaining terrace drains within specific areas.

6.9. Foundations—Residential

6.9.1. The foundation recommendations that follow are for one- or two-story residential structures and are separated into categories dependent on the thickness and geometry of the underlying fill soils as well as the Expansion Index of the prevailing subgrade soils of a particular building pad (or lot). The recommended minimum foundation and interior concrete slab design criteria for each category is presented on Table 6.9.

TABLE 6.9.1.
FOUNDATION RECOMMENDATIONS BY CATEGORY

Foundation Category	Minimum Footing Depth (inches)	Continuous Footing Reinforcement	Interior Slab Reinforcement
I	12	One No. 4 bar top and bottom	6 x 6 - 10/10 welded wire mesh at slab mid-point
II	18	Two No. 4 bars top and bottom	No. 3 bars at 24 inches on center, both directions
III	24	Two No. 5 bars top and bottom	No. 3 bars at 18 inches on center, both directions

CATEGORY CRITERIA

Category I: Maximum fill thickness is less than 20 feet and Expansion Index is less than or equal to 50.

Category II: Maximum fill thickness is less than 50 feet and Expansion Index is less than or equal to 90, or variation in fill thickness is between 10 feet and 20 feet.

Category III: Fill thickness exceeds 50 feet, or variation in fill thickness exceeds 20 feet, or Expansion Index exceeds 90, but is less than 130.

Notes:

1. All footings should have a minimum width of 12 inches.
2. Footing depth is measured from lowest adjacent subgrade.
3. All interior living area concrete slabs should be at least four inches thick for Categories I and II and 5 inches thick for Category III.
4. All interior concrete slabs should be underlain by at least 4 inches (3 inches for Category III) of clean sand or crushed rock.
5. All slabs expected to receive moisture sensitive floor coverings or used to store moisture sensitive materials should be underlain by a vapor barrier covered with at least 2 inches of the clean sand recommended in No. 4 above.

6.9.2. Foundations for either Category I, II, or III may be designed for an allowable soil bearing pressure of 2,000 pounds per square foot (psf) (dead plus live load). This bearing pressure may be increased by one-third for transient loads such as wind or seismic forces.

6.9.3. The use of isolated footings which are located beyond the perimeter of the building and support structural elements connected to the building is not recommended for Category III. Where this condition cannot be avoided, the isolated footings should be connected to the building foundation system with grade beams.

6.9.4. For Foundation Category III, the structural slab design should consider using interior stiffening beams and connecting isolated footings and/or increasing the slab thickness. In addition, consideration should be given to connecting patio slabs, which exceed 5 feet in width, to the building foundation to reduce the potential for future separation to occur.

6.9.5. No special subgrade presaturation is deemed necessary prior to placing concrete, however, the exposed foundation and slab subgrade soils should be sprinkled, as necessary, to maintain a moist condition as would be expected in any such concrete placement.

6.9.6. Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- For fill slopes less than 20 feet high, building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

- Where the height of the fill slope exceeds 20 feet, the minimum horizontal distance should be increased to H/3 (where H equals the vertical distance from the top of the slope to the toe) but need not exceed 40 feet. For composite (fill over cut) slopes, H equals the vertical distance from the top of the slope to the bottom of the fill portion of the slope. An acceptable alternative to deepening the footings would be the use of a post-tensioned slab and foundation system or increased footing and slab reinforcement. Specific design parameters or recommendations for either of these alternatives can be provided once the building location and fill slope geometry have been determined.

- For cut slopes in dense formational materials, or fill slopes inclined at 3:1 (horizontal:vertical) or flatter, the bottom outside edge of building footings should be at least 7 feet horizontally from the face of the slope, regardless of slope height.

- Although other improvements which are relatively rigid or brittle, such as concrete flatwork or masonry walls may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures which would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

6.9.7. As an alternative to the foundation recommendations for each category, consideration should be given to the use of post-tensioned concrete slab and foundation systems for the support of the proposed structures. The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-Tensioning Institute (UBC Chap. 18, Div. III, §1815, 1994). Although this procedure was developed for expansive soils, it is understood that it can also be used to reduce the potential for foundation distress due to differential fill settlement. The post-tensioned design should incorporate the geotechnical parameters presented on the following table entitled *Post-Tensioned Foundation System Design Parameters* for the particular Foundation Category designated.

TABLE 6.9.2.
POST-TENSIONED FOUNDATION SYSTEM DESIGN PARAMETERS

Post-Tensioning Institute (PTI) Design Parameters	**Foundation Category**		
	I	**II**	**III**
1. Thornthwaite Index	-20	-20	-20
2. Clay Type - Montmorillonite	Yes	Yes	Yes
3. Clay Portion (Maximum)	30%	50%	70%
4. Depth to Constant Soil Suction	7.0 ft.	7.0 ft.	7.0 ft.
5. Soil Suction	3.6 ft.	3.6 ft.	3.6 ft.
6. Moisture Velocity	0.7 in./mo.	0.7 in./mo.	0.7 in./mo.
7. Edge Lift Moisture Variation Distance	2.6 ft.	2.6 ft.	2.6 ft.
8. Edge Lift	0.41 in.	0.78 in.	1.15 in.
9. Center Lift Moisture Variation Distance	5.3 ft.	5.3 ft.	5.3 ft.
10. Center Lift	2.12 in.	3.21 in.	4.74 in.

6.9.8. UBC Chap. 18, Div. III, §1815, 1994 uses interior stiffener beams in its structural design procedures. If the structural engineer proposes a post-tensioned foundation design method other than UBC Chap. 18, Div. III, §1815, 1994, it is recommended that interior stiffener beams be used for Foundation Categories II and III. The depth of the perimeter foundation should be at least 12 inches for Foundation Category I. Where the Expansion Index for a particular building pad exceeds 50 but is less than 91, the perimeter footing depth should be at least 18 inches; and where it exceeds 90 but is less than 130, the perimeter footing depth should be at least 24 inches. Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

6.9.9. The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soils (if present), differential settlement of deep fills or fills of varying thickness. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entry slab corners occur.

6.10. Foundations—Commercial

6.10.1. Foundation design recommendations for commercial structures can vary significantly depending on the building size, structural loading, and location within the project. In addition, the as-graded condition including fill thickness/fill thickness differential and expansive soil characteristics at finish grade can affect the foundation recommendations.

6.10.2. It is recommended that Geocon Incorporated be contacted during the preliminary design phase for the commercial buildings. At that time, site-specific foundation design recommendations can be presented prior to finalizing improvement plans.

6.11. Retaining Walls and Lateral Loads

6.11.1. Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 30 pounds per cubic foot (pcf). Where the backfill will be inclined at no steeper than 2.0 to 1.0, an active soil pressure of 40 pcf is recommended. These soil pressures assume that the backfill materials within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall possess an Expansion Index of less than 50. For those lots with finish grade soils having an Expansion Index greater than 50 and/or where backfill materials do not conform with the above criteria, Geocon Incorporated should be consulted for additional recommendations.

6.11.2. Unrestrained walls are those that are allowed to rotate more than 0.001H at the top of the wall. Where walls are restrained from movement at the top, an additional uniform pressure of 7H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the above active soil pressure.

6.11.3. All retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes, etc.) is not recommended where the seepage could be a nuisance or otherwise adversely impact the property adjacent to the base of the wall. A typical wall drainage detail is presented on Figure 5. The above recommendations assume a properly compacted granular (Expansion Index less than 50) backfill material with no hydrostatic forces or imposed surcharge load. If conditions different than those described are anticipated, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

6.11.4. In general, wall foundations having a minimum depth and width of one foot may be designed for an allowable soil bearing pressure of 2,000 psf, provided the soil within 3 feet below the base of the wall has an Expansion Index of less than 90. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is anticipated.

6.11.5. For resistance to lateral loads, an allowable passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils or undisturbed natural soils. The allowable passive pressure assumes a horizontal surface extending at least 5 feet or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance. An allowable friction coefficient of 0.4 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the allowable passive earth pressure when determining resistance to lateral loads.

6.11.6. The recommendations presented above are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 8 feet. In the event that walls higher than 8 feet or other types of walls are planned, such as crib-type walls, Geocon Incorporated should be consulted for additional recommendations. In particular, the approximately 20-foot-high wall planned for the north side of a portion of Camino Del Norte will require special consideration once the geometry of the wall is better defined.

6.12. Preliminary Pavement Design

6.12.1. It is anticipated that dedicated public streets will be designed in accordance with the City of San Diego standards utilizing cement-treated base (CTB). Pavement sections for various road classifications have been determined as discussed below.

6.12.2. For the purposes of preliminary pavement design for the project, R-Value tests were evaluated from the adjacent Villa Panacea project on samples of subgrade materials expected to be similar to those that may be encountered on the project. An average R-Value of 20 was utilized for design which represents an average value of the eight samples tested. Pavement sections were based on City of San Diego Standard Drawing SDG-113, *Pavement Design Standards-Schedule J*, (revised September 11, 1995). The following table presents the anticipated preliminary pavement sections for the various road classifications and maximum Traffic Indices provided to us for use as a guideline. The values presented are for preliminary budgeting purposes and may or may not be indicative of the final pavement structural sections depending on the finish grade soil conditions for any particular area.

TABLE 6.12.
PRELIMINARY PAVEMENT SECTIONS (R-VALUE = 20)
(CITY OF SAN DIEGO)

Road Classification	Traffic Index (TI)	Asphalt Concrete (inches)	Cement-Treated Base (inches)
Prime Arterial	11.5	5.5	17.5
Major (6-Lane)	11.0	5.0	17.0
Major (4-Lane)	10.5	5.0	16.0
Collector	8.0	3.5	12.0
Local (Residential)	6.0	3.0	8.0

6.12.3. The upper 12 inches of subgrade soils should be properly moisture conditioned and compacted to a minimum relative compaction (ASTM D 1557-91) of 95 percent at or above optimum moisture content. Class 2 base should conform to Section 200-2 of the *Standard Specifications for Public Works Construction* (Green Book) and be compacted to a minimum relative compaction of 95 percent at or near optimum moisture content. Asphalt concrete should conform to Section 203-6 of the Green Book.

6.12.4. Where trash bin enclosures are planned within asphalt paved areas, it is recommended that a PCC pavement section consisting of 6 inches of portland cement concrete (minimum Modulus of Rupture of 600 psi) reinforced with No. 3 bars spaced at 24 inches in each direction be utilized. The concrete should extend into the roadway sufficiently so that the front wheels of the trash truck are on the concrete when loading.

6.12.5. Landscape planters immediately adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. It is suggested that either area drains and/or subdrains, which collect excess irrigation water and transmit it to drainage structures, or impervious, above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, it is recommended that consideration be given to providing a cutoff wall along the edge of the pavement extending a minimum of 6 inches below base of the pavement section.

6.13. Drainage and Maintenance

6.12.1 Good drainage is imperative to reduce the potential for differential soil movement, erosion and subsurface seepage. Positive measures should be taken to properly finish grade the building pads after the structures and other improvements are in place, so that the drainage water from the buildings, lots and adjacent properties are directed off the lots and to the street away from foundations and the top of the slopes. Experience has shown that even with these provisions, a shallow groundwater or subsurface water condition can and may develop in areas where no such water conditions existed prior to the site development; this is particularly true where a substantial increase in surface water infiltration results from an increase in landscape irrigation.

6.14. Grading Plan Review

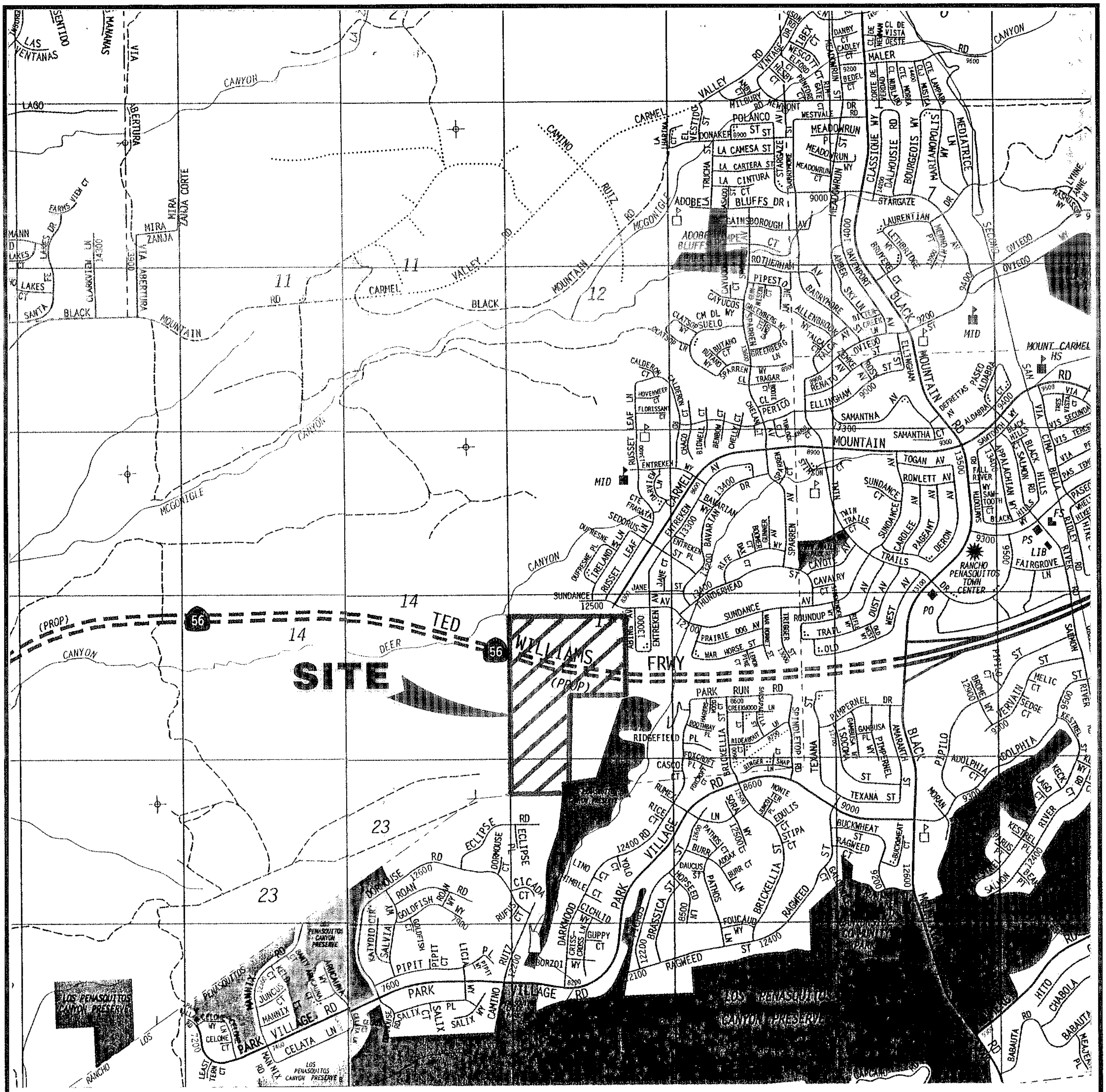
6.14.1. The soils engineer and engineering geologist should review the Grading Plans prior to finalization to verify their compliance with the recommendations of this report and determine the need for additional investigation, comments, recommendations and/or analysis.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



SOURCE : 1998 THOMAS BROTHERS MAP
SAN DIEGO COUNTY, CALIFORNIA

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N

NO SCALE

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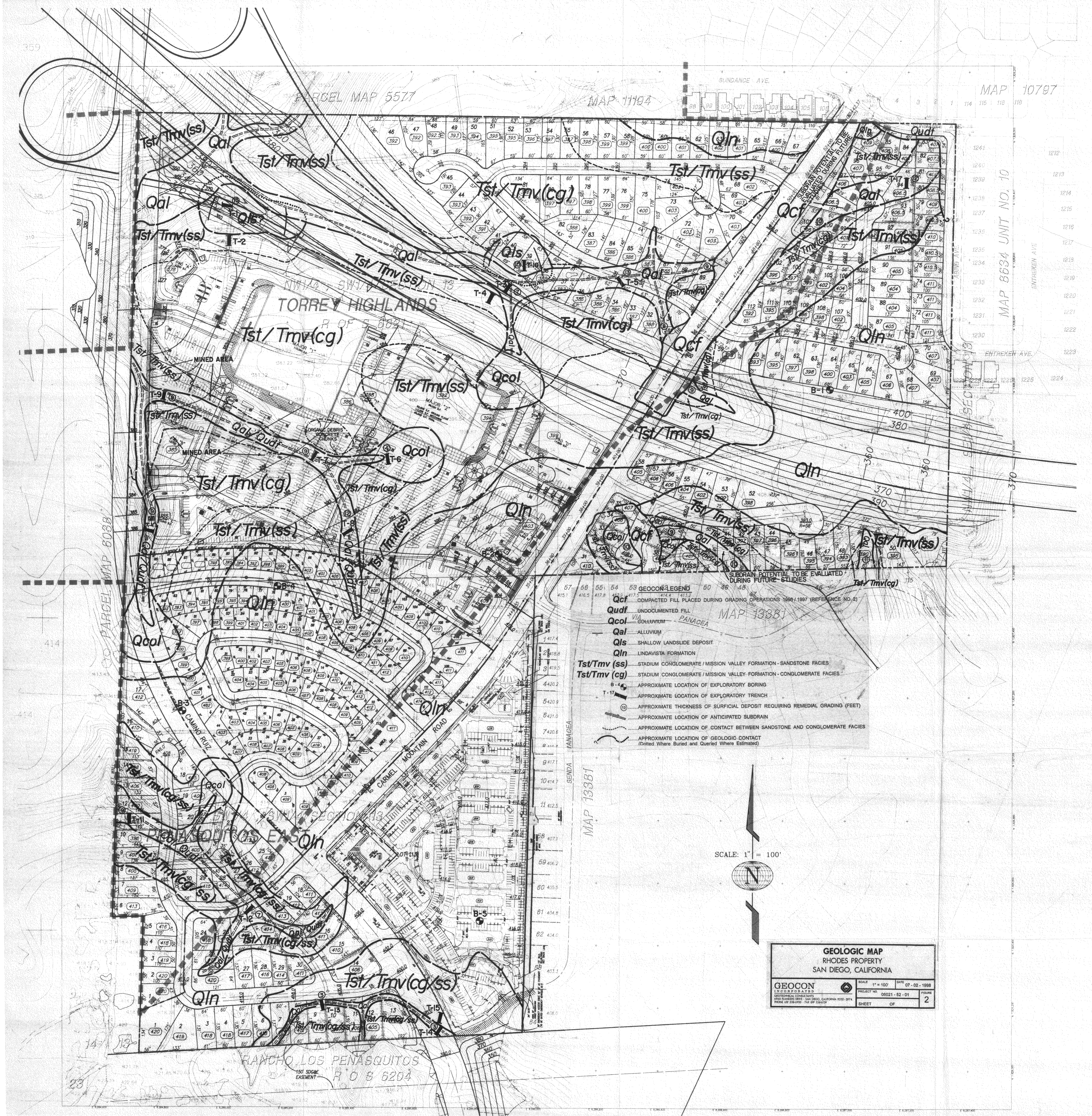
VICINITY MAP

RHODES PROPERTY
SAN DIEGO, CALIFORNIA

DBE / RSA		DSK / E000D	DATE 07-02-1998	PROJECT NO. 06021 - 52 - 01	FIG. 1

1VICMAP



GEOCON LEGEND

Qcf	COMPACTED FILL PLACED DURING GRADING OPERATIONS 1996 / 1997 (REFERENCE NO. 2)
Qudf	UNDOCUMENTED FILL
Qcol	COLLUVIUM
Qal	ALLUVIUM
Qls	SHALLOW LANDSLIDE DEPOSIT
Qln	LINDAVISTA FORMATION
Tst/Tmv (ss)	STADIUM CONGLOMERATE / MISSION VALLEY FORMATION - SANDSTONE FACIES
Tst/Tmv (cg)	STADIUM CONGLOMERATE / MISSION VALLEY FORMATION - CONGLOMERATE FACIES
B - 4	APPROXIMATE LOCATION OF EXPLORATORY BORING
T - 17	APPROXIMATE LOCATION OF EXPLORATORY TRENCH
⑬	APPROXIMATE THICKNESS OF SURFICIAL DEPOSIT REQUIRING REMEDIAL GRADING (FEET)
	APPROXIMATE LOCATION OF ANTICIPATED SUBDRAIN
	APPROXIMATE LOCATION OF CONTACT BETWEEN SANDSTONE AND CONGLOMERATE FACIES
?	APPROXIMATE LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried and Queried Where Estimated)

GEOLOGIC MAP
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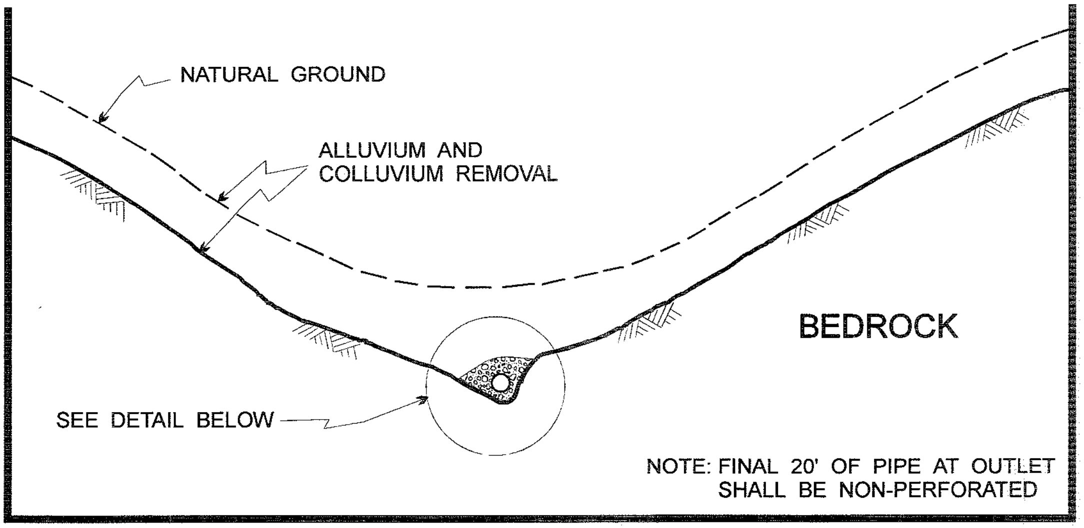
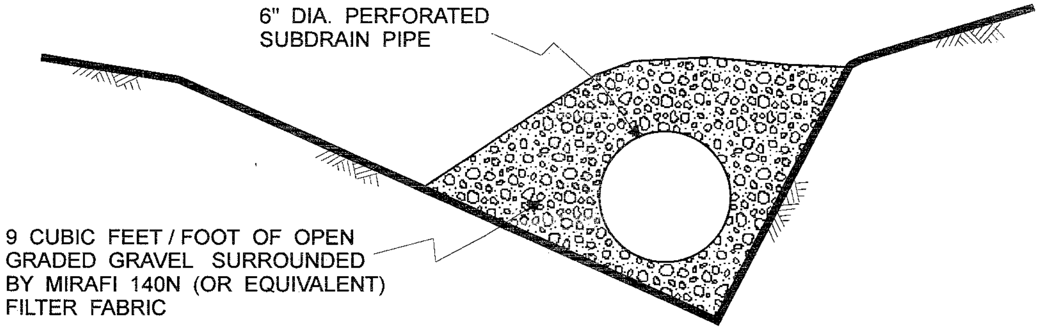
SCALE 1" = 100'
DATE 07 - 02 - 1998
PROJECT NO. 06021 - 52 - 01
FIGURE 2
SHEET OF





NOTES:

1....8-INCH DIAMETER SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH

2....6-INCH DIAMETER SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH

NO SCALE

TYPICAL CANYON SUBDRAIN DETAIL

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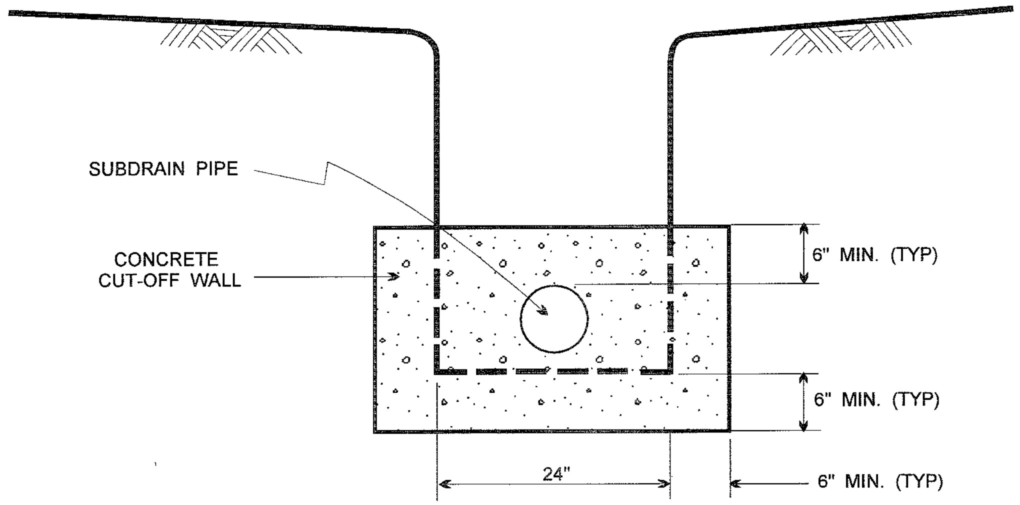
PROJECT NO. 06021 - 52 - 01
FIG 3

CYNDTAIL

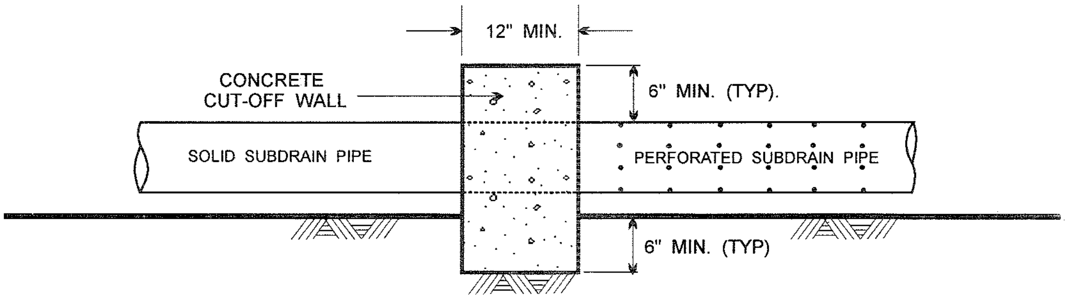
I.T/GTYP/96

FRONT VIEW



NO SCALE

SIDE VIEW



NO SCALE

RECOMMENDED SUBDRAIN CUT-OFF WALL

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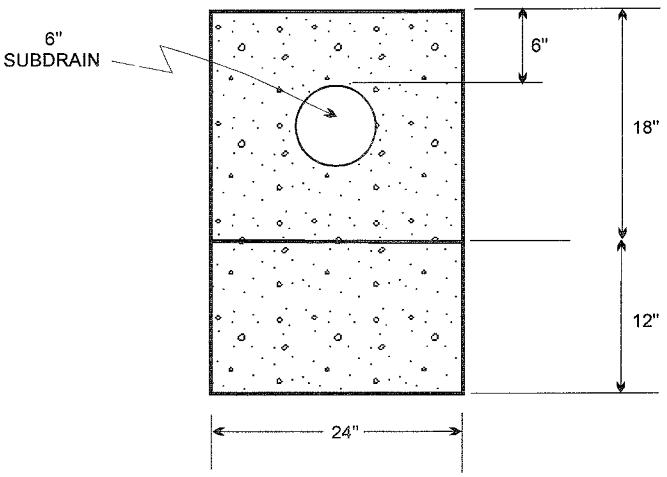
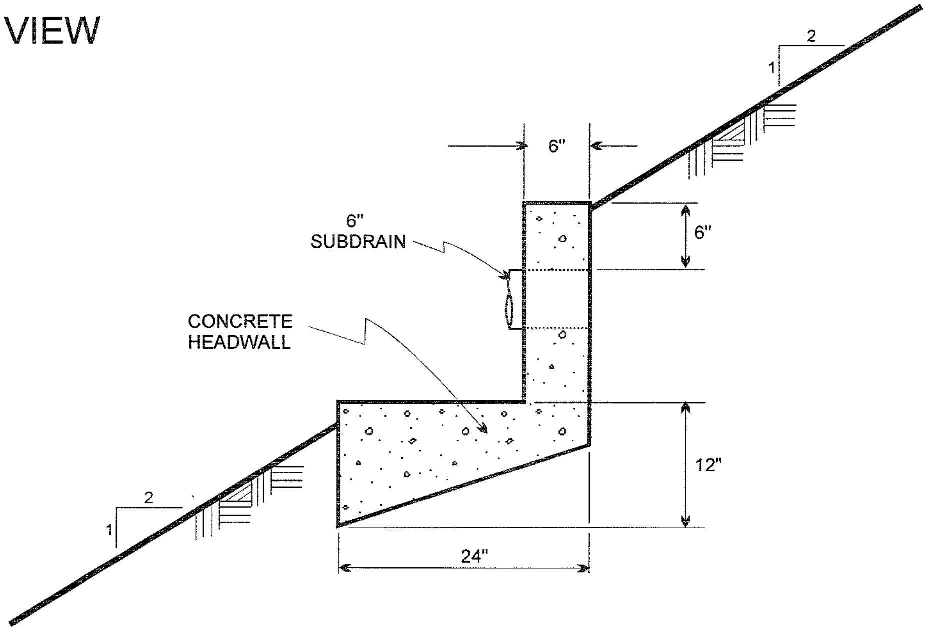
RSCOW / VIII-IXV

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE : HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE
OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

SUBDRAIN OUTLET HEADWALL DETAIL

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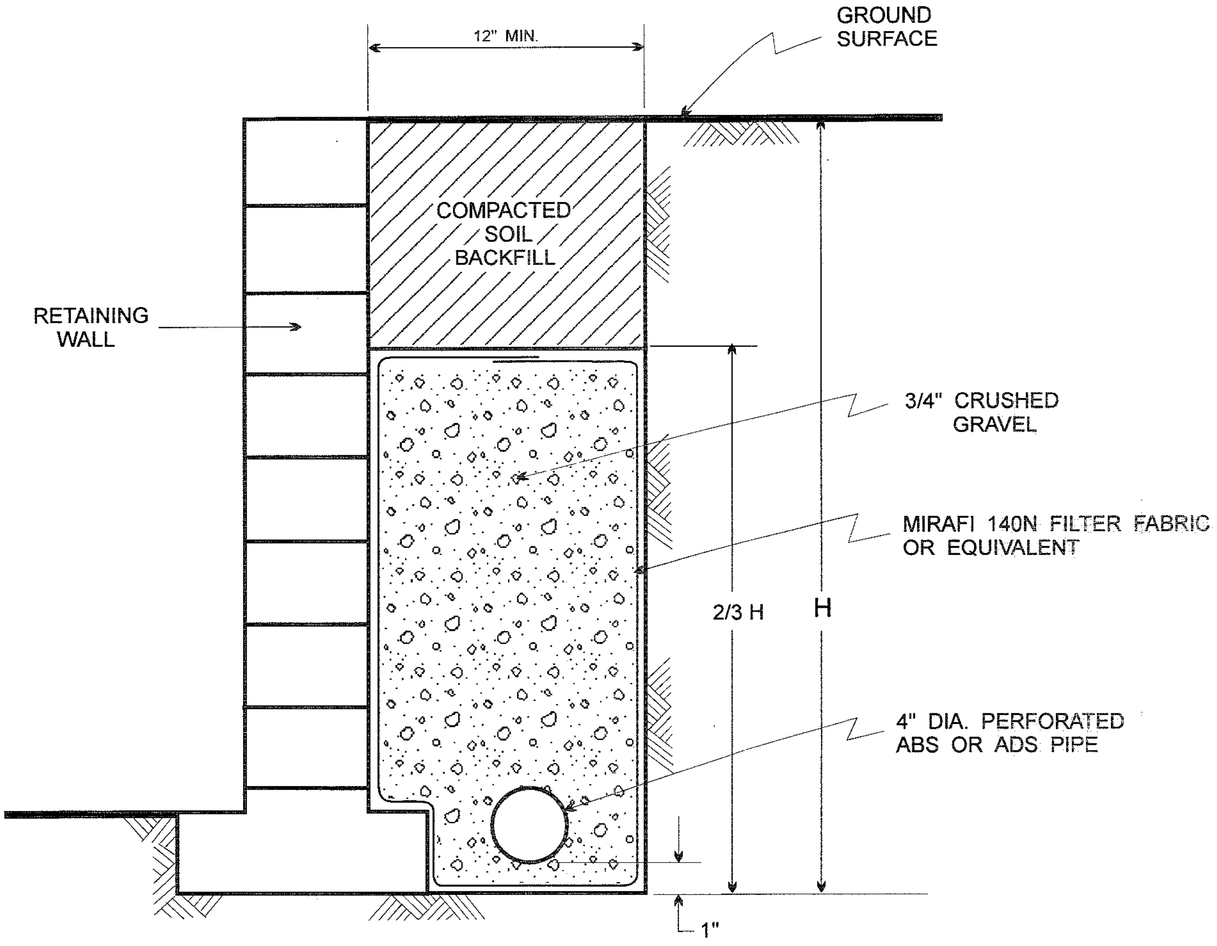
DBE / RSA		DSK / E0000

DATE 07-02-1998	PROJECT NO. 06021 - 52 - 01	FIG. 5

SOHD / VIII-IXV



NO SCALE

TYPICAL RETAINING WALL DRAINAGE DETAIL

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DBE / RSA		DSK / G0000	DATE 07-02-1998	PROJECT NO. 06021 - 52 - 01	FIG. 6

RETWALL

RSS/GSITEPLN/94

ASSUMED CONDITIONS:

Slope Height	$H = 70$ feet
Slope Inclination	2:1 (Horizontal :Vertical)
Total Unit Weight of Soil	$\gamma_t = 130$ pounds per cubic foot
Angle of Internal Friction	$\phi = 32$ degrees
Apparent Cohesion	$C = 500^*$ pounds per square foot
No Seepage Forces	

*Cohesion adjusted to correct for cementation

ANALYSIS:

$$\gamma_{c\phi} = \frac{\gamma H \tan\phi}{C}$$ Equation (3-3), Reference 1

$$FS = \frac{N_{cf} C}{\gamma H}$$ Equation (3-2), Reference 1

$\gamma_{c\phi} = 11.4$ Calculated Using Eq. (3-3)

$N_{cf} = 35$ Determined Using Figure 10, Reference 2

$FS = 1.9$ Factor of Safety Calculated Using Eq. (3-2)

REFERENCES:

(1) Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954.

(2) Janbu, N., Discussion of J. M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

CUT SLOPE STABILITY ANALYSIS

RHODES PROPERTY

SAN DIEGO, CALIFORNIA

FIGURE NO. 7

ASSUMED CONDITIONS:

Slope Height	H	=	70	feet
Slope Inclination	2:1	(Horizontal :Vertical)		
Total Unit Weight of Soil	γ_t	=	130	pounds per cubic foot
Angle of Internal Friction	ϕ	=	33	degrees
Apparent Cohesion	C	=	460	pounds per square foot
No Seepage Forces				

ANALYSIS:

$\gamma_{c\phi} = \frac{\gamma H \tan\phi}{C}$ Equation (3-3), Reference 1

$FS = \frac{N_{cf} C}{\gamma H}$ Equation (3-2), Reference 1

$\gamma_{c\phi}$ = 12.9 Calculated Using Eq. (3-3)

N_{cf} = 40 Determined Using Figure 10, Reference 2

FS = 2.0 Factor of Safety Calculated Using Eq. (3-2)

REFERENCES:

(1) Janbu, N., Stability Analysis of Slopes with Dimensionless Parameters, Harvard Soil Mechanics, Series No. 46, 1954.

(2) Janbu, N., Discussion of J. M. Bell, Dimensionless Parameters for Homogeneous Earth Slopes, Journal of Soil Mechanics and Foundation Design, No. SM6, November 1967.

FILL SLOPE STABILITY ANALYSIS

RHODES PROPERTY

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ASSUMED CONDITIONS:

Slope Height	H	=	Infinite	
Depth of Saturation	Z	=	3	feet
Slope Inclination	2:1	(Horizontal :Vertical)		
Slope Angle	i	=	27	degrees
Unit Weight of Water	γ_w	=	62.4	pounds per cubic foot
Total Unit Weight of Soil	γ_t	=	130	pounds per cubic foot
Angle of Internal Friction	ϕ	=	33	degrees
Apparent Cohesion	C	=	460	pounds per square foot

Slope saturated to vertical depth Z below slope face.
Seepage forces parallel to slope face

ANALYSIS:

$$\text{FS} = \frac{C+(\gamma_t-\gamma_w)Z\cos^2 i\tan\phi}{\gamma_t Z\sin i\cos i} = 1.9$$

REFERENCES:

(1) Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage,* Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62.

(2) Skempton, A. W., and F. A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81.

SURFICIAL SLOPE STABILITY ANALYSIS

RHODES PROPERTY

SAN DIEGO, CALIFORNIA

FIGURE NO. 9

APPENDIX A

FIELD INVESTIGATION

The field investigation was performed on December 19 and 29, 1997, and consisted of a visual site reconnaissance, the excavation of 5 large-diameter borings and 17 backhoe trenches. The approximate locations of the exploratory borings and trenches are shown on Figure 2.

The borings were advanced to depths ranging from 15 to 55 feet below existing grade using a an Easy Bore 120 truck-mounted drill rig equipped with a 30-inch-diameter bucket auger. Relatively undisturbed samples were obtained by driving a 3-inch, split-tube sampler 12 inches into the undisturbed soil mass with blows from a telescoping Kelly bar varying in weight from 1800 to 4500 pounds. The sampler was equipped with six 1-inch by 2.5-inch brass sampler rings to facilitate removal and testing. Bulk samples were also obtained.

The backhoe trenches were advanced to depths of 3 to 16 feet using a JD 555 extend-a-hoe equipped with a 24-inch-wide bucket. The soils encountered in the borings and backhoe trenches were visually examined, classified, and logged. Logs of borings and backhoe trenches are presented on Figures A-1 through A-23. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained.

PROJECT NO. 06021-52-01

BORING B 1

ELEV. (MSL.) 412 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND			
2								
4	B1-1			SM/SC	**LINDA VISTA FORMATION** Dense, damp, orange-brown, Silty/Clayey, fine to very coarse SAND with abundant gravel and some cobble			
6								
8	B1-2 B1-3			SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown to light gray, Silty fine SANDSTONE; massive, micaceous, some clay infilled fractures	4	121.4	12.6
10								
12								
14					-Claystone rip-up clasts at 14 feet			
16	B1-4					7	129.7	9.3
18								
20	B1-5 B1-6				-Well cemented zones below 20.5 feet	8/10"	120.2	10.7
22								
24								
26								
28				GM	-Near horizontal contact at 27 feet Very dense, damp, light orange brown, Silty, fine to medium Sandy GRAVEL CONGLOMERATE with some cobble; matrix supported, slightly to moderately cemented, predominant clast size 2 inches			

Figure A-1 **Log of Boring B 1, page 1 of 2**

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

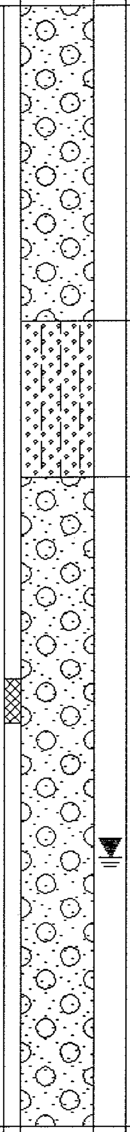
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 1

ELEV. (MSL.) 412 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30								
32				GM				
34					-Increase in clast size at 34 feet			
36								
					-Near horizontal contact at 37 feet			
38				SM	Dense, damp, light grey, Silty fine SANDSTONE			
40								
42				GM	Very dense, damp, light orange-brown, Silty, fine to medium Sandy GRAVEL/COBBLE CONGLOMERATE			
44					-Becomes moist to very moist at 44 feet			
46	B1-7	⊠						
48								
			▼		-Moderate to heavy seepage at 49 feet			
50								
52								
54								

BORING TERMINATED AT 55 FEET

Figure A-2 **Log of Boring B 1, page 2 of 2**

RHODE

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 2

ELEV. (MSL.) 421 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	⊠ B2-1			SM	**TOPSOIL** Loose, damp to moist, dark brown, Silty, fine to medium SAND with little clay and gravel/cobble			
2					**LINDAVISTA FORMATION** Dense, damp to moist, orange-brown, Silty, fine to very coarse SAND with some gravel/cobble; some zones of reddish brown clay and clay matrix, sporadic cobbles up to 6-inches long			
	⊠ B2-2							
4	■ B2-3			SM/GM		4	124.8	12.4
6								
8								
10	■ B2-4			SM/SC	Dense, damp, orange-brown, Silty/Clayey, fine to very coarse SAND; some silty fine sand zones	6/10"	120.9	11.3
12								
14					-Sharp horizontal contact at 15 feet			
	■ B2-5					6	110.4	11.2
16					**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown to light gray, Silty fine SANDSTONE; low cohesion, sporadic cobbles up to 4-inches long			
18	⊠ B2-6			SM				
20	■ B2-7					5/7"	121.1	8.8

BORING TERMINATED AT 21 FEET

Figure A-3 **Log of Boring B 2, page 1 of 1**

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 3

ELEV. (MSL.) 412 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	▨ B3-1			SM	**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND with trace of clay			
2				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown to light grey, Silty, fine to medium SANDSTONE with trace of clay; gravel/cobble zones, massive with clay infilled fractures			
4								
	■ B3-2					5	112.4	12.5
6								
8								
10	■ B3-3					7	124.3	11.8
	▨ B3-4							
12								
					-Becomes light grey and micaceous at 13 feet			
14								
	■ B3-5					3	113.5	11.7
16								
18					-Several thin claystone lenses from 17 to 18 feet			
20	■ B3-6					7	116.8	14.7
					BORING TERMINATED AT 21 FEET			

Figure A-4 **Log of Boring B 3, page 1 of 1**

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◪ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

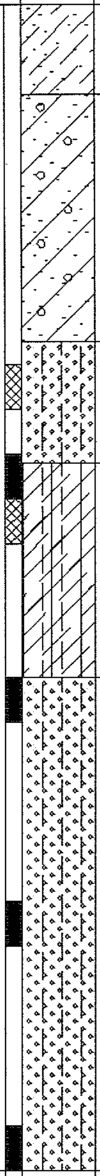
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 4

ELEV. (MSL.) 418 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER



DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SC/CL	**TOPSOIL** Soft to stiff, moist, orange-brown, Clayey fine SAND/fine Sandy CLAY with gravel/cobble			
2		GC	**LINDAVISTA FORMATION** Dense, moist, light brown to orange-brown, Clayey, fine to very coarse Sandy GRAVEL with some cobble			
6		SC/SM	-Decrease in clay and gravel/cobble content at 6 feet -Sharp near horizontal contact at 7.5 feet			
8	☒ B4-1	SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown, Silty fine SANDSTONE;micaceous			
10	■ B4-2		-Sharp horizontal contact at 10.2 feet	6	109.8	16.5
	☒ B4-3	CL/ML	Hard, damp, greyish-green, Silty CLAYSTONE/Clayey SILTSTONE;micaceous			
15	■ B4-4	SM	-Gradational contact at 15 feet Dense, damp, light grey, Silty fine SANDSTONE; massive	6/10"	123.8	12.2
20	■ B4-5			4/5"	106.9	9.8
25	■ B4-6			5/6"	112.1	8.4
26			BORING TERMINATED AT 26 FEET			

Figure A-5 Log of Boring B 4, page 1 of 1

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 5

ELEV. (MSL.) 420 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM/SC	**TOPSOIL** Loose, moist, dark brown, Silty/Clayey, fine to coarse SAND with gravel/cobble			
2 4 6	■ B5-1			SM/GM	**LINDAVISTA FORMATION** Dense, damp to moist, light brown to orange brown, Silty, fine to very coarse SAND with abundant GRAVEL/COBBLE; trace of clay -Becomes very dense with a decrease in gravel content at 4 feet -Sharp near horizontal contact	5/8"	113.6	12.9
8 10	■ B5-2 ⊠ B5-3			SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown, Silty fine SANDSTONE; micaceous	5/8"	114.9	7.0
12 14				GM	Dense, damp, light brown, Silty, fine to medium Sandy GRAVEL/COBBLE CONGLOMERATE; matrix supported			
					BORING TERMINATED AT 15 FEET			

Figure A-6 **Log of Boring B 5, page 1 of 1**

RHODE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 1

ELEV. (MSL.) 329 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**LANDSLIDE DEBRIS** Loose, moist, dark brown, Silty, fine to medium SAND			
2				CL	Soft to stiff, very moist, grayish brown with orange mottling, Silty CLAY with fine sand; some cobble and gravel, abundant roots and root hairs			
4								
6								
8					-Lens of stiff bluish-gray, Silty CLAY from 8 to 9 feet; sheared appearance			
10				GC	Medium dense, moist, grayish brown with orange mottling, fine to medium Sandy/Clayey GRAVEL/COBBLE **-BASAL SHEAR ZONE FROM 12 TO 13 FEET**; Zone of stiff brown clay with sheared appearance, poorly defined slip zone, clay appears to have residual shear fabric			
12								
14				SM/ML	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, moist, light brown and green, Silty, fine to medium SANDSTONE/fine to medium Sandy SILTSTONE with little clay; Some gravel/cobble and orange staining			
16					TRENCH TERMINATED AT 16 FEET			

Figure A-7, Log of Trench T 1

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE ◩ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 2

ELEV. (MSL.) 346 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		▨		CL	**TOPSOIL** Stiff, very moist, orange-brown, fine Sandy CLAY			
2 4		░		SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, yellowish-brown, Silty fine SANDSTONE; Weathered with abundant clay films -4 inch thick gray-brown claystone lens at 3.5 feet			
					TRENCH TERMINATED AT 5.5 FEET			

Figure A-8, Log of Trench T 2

RHODE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 3

ELEV. (MSL.) **348** DATE COMPLETED **12/29/97**

EQUIPMENT **JD 555 BACKHOE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ALLUVIUM** Loose, damp, dark brown, Silty, fine to medium SAND			
2			▼	SC/CL	Loose, wet to saturated, dark brown, Clayey SAND/Sandy CLAY;Abundant gravel/cobble -Heavy seepage at 2 feet, difficult digging -Increase in gravel/cobble at 5 feet -Heavy water flow at contact			
4								
6								
				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, very moist, light brown, Silty, fine to medium SANDSTONE			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-9, Log of Trench T 3

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 4

ELEV. (MSL.) 355 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Loose, moist, dark brown, Silty fine SAND			
2				CL	Soft, very moist, orange-brown, Silty CLAY			
4				SM	**STADIUM CONGLOMERATE\MISSION VALLEY FORMATION** Dense, damp, light brown, Silty, fine to medium SANDSTONE with some coarse grains; Thin, near horizontal bedding, brown clay films			
6								
					TRENCH TERMINATED AT 6.5 FEET			

Figure A-10, Log of Trench T 4

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

▨ ... DISTURBED OR BAG SAMPLE

◧ ... STANDARD PENETRATION TEST

◪ ... CHUNK SAMPLE

■ ... DRIVE SAMPLE (UNDISTURBED)

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 5

ELEV. (MSL.) 365 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ALLUVIUM** Loose, wet, dark brown, Clayey fine SAND/fine Sandy CLAY with abundant gravel/cobble			
2			▽	SC/CL/GC	-Slight seepage at 2 feet			
4								
6					-Becomes soft, wet to saturated and bluish grey at 6 feet			
8			▼		-Heavy seepage at 8 feet, difficult digging			
10								
12								
14				SM/ML	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Medium dense, moist, bluish-green, Silty fine SANDSTONE/fine Sandy SILTSTONE with little clay			

TRENCH TERMINATED AT 14 FEET

Figure A-11, Log of Trench T 5

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

◧ ... STANDARD PENETRATION TEST

■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE

◣ ... CHUNK SAMPLE

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 6

ELEV. (MSL.) 380 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**COLLUVIUM** Loose, damp, brown, Silty fine SAND			
2				CL	Stiff, moist, brown, fine Sandy CLAY			
				GC	Medium dense, moist, brown, Clayey GRAVEL/COBBLE			
4				GM/GC	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Very dense, damp, light brown with orange staining, Silty/Clayey, fine to coarse Sandy GRAVEL/COBBLE CONGLOMERATE			
					TRENCH TERMINATED AT 5 FEET			

Figure A-12, Log of Trench T 6

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 7

ELEV. (MSL.) 362 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM/GM	**ALLUVIUM/UNDOCUMENTED FILL** Loose, damp, brown, Silty, fine to medium SAND with abundant gravel/cobble; abundant organics			
2								
4								
6								
8								
10				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, yellowish-brown, Silty, fine to medium SANDSTONE			

TRENCH TERMINATED AT 10 FEET

Figure A-13, Log of Trench T 7

RHODE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

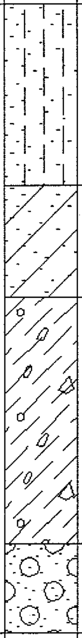
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 8

ELEV. (MSL.) 382 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				SM	**ALLUVIUM** Loose, damp, brown, Silty, fine to medium SAND with a trace of clay; very porous, abundant rootlets			
4 6				CL/SC	Stiff, very moist, brown, fine to medium Sandy CLAY/Clayey, fine to medium SAND -Increases in clay content at 5.5 feet			
8 10				GC	Medium dense, moist, grayish-brown, Clayey, fine to coarse GRAVEL/COBBLE; some cobbles up to 10 inches long			
12 14				GM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, moist, yellowish-brown, Silty, fine to medium Sandy GRAVEL/COBBLE CONGLOMERATE; decrease in gravel/cobble at 13 feet			

TRENCH TERMINATED AT 14 FEET

Figure A-14, Log of Trench T 8

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 9

ELEV. (MSL.) 334 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				SM/GM	**UNDOCUMENTED FILL** Loose, moist, yellowish-brown, Silty, fine to medium SAND with abundant gravel/cobble			
4 6				CL	**ALLUVIUM** Soft, very moist, brown, fine to medium Sandy CLAY; gravel fragments, orange mottling, porous			
8				GC	Medium dense, moist, dark brown, Clayey GRAVEL/COBBLE			
10				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, yellowish-brown with orange staining, Silty, fine to medium SANDSTONE			
					TRENCH TERMINATED AT 10 FEET			

Figure A-15, Log of Trench T 9

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

◧ ... STANDARD PENETRATION TEST

■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE

◪ ... CHUNK SAMPLE

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 10

ELEV. (MSL.) **366** DATE COMPLETED **12/29/97**

EQUIPMENT **JD 555 BACKHOE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				SC/GC	**UNDOCUMENTED FILL** Loose, moist, orange-brown, Clayey, fine to medium SAND with abundant gravel/cobble			
4 6 8				GM	Loose, dry to damp, light grey to brown, Silty fine SAND with abundant gravel/cobble -Barbwire in two locations of trench wall at 8 feet			
10				SM	**STADIUM CONGLOMERATE** Dense, damp, yellowish-brown, Silty, fine to medium SANDSTONE			

TRENCH TERMINATED AT 10 FEET

Figure A-16, Log of Trench T 10

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 11

ELEV. (MSL.) 375 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				SM/SC	**UNDOCUMENTED FILL** Loose, moist, orange-brown, Silty/Clayey, fine to medium SAND with abundant cobble; visible lifts, roots at lift boundaries			
4				SM	Loose, dry to damp, light brown to grey, Silty fine SAND with trace of clay; occasional gravel/cobble, abundant rootlets			
6				SC	Soft, very moist, dark brown, Clayey, fine to medium SAND			
8				SM	Loose, damp, brown, Silty, fine to medium SAND			
10				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp to moist, light gray with orange staining, Silty, fine to medium SANDSTONE			
					TRENCH TERMINATED AT 11 FEET			

Figure A-17, Log of Trench T 11

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 12

ELEV. (MSL.) 392 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6			▼	SM/GM	**UNDOCUMENTED FILL** Loose, moist, dark brown, Silty fine SAND with some gravel/cobble; abundant rootlets, root pockets at lift boundaries, visible lifts -Increase in gravel/cobble at 3 feet with some clayey zones -Moderate seepage at 6 feet -One-foot-thick clay lens at 6 feet			
8				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, moist, orange-brown, Silty, fine to medium SANDSTONE			

TRENCH TERMINATED AT 8 FEET

Figure A-18, Log of Trench T 12

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 13

ELEV. (MSL.) 374 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				GM	**ALLUVIUM** Loose, damp, brown, Silty, fine to medium Sandy GRAVEL/COBBLE -One-foot-thick Sandy CLAY lens at 2 feet			
4				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange staining, Silty fine SANDSTONE with some cobble			
					TRENCH TERMINATED AT 5 FEET			

Figure A-19, Log of Trench T 13

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 14

ELEV. (MSL.) 341 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**ALLUVIUM** Loose, damp, brown, Silty, fine to medium Sandy GRAVEL/COBBLE -One-foot-thick sandy clay lens at 2 feet			
2				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange staining, Silty fine SANDSTONE			
4					TRENCH TERMINATED AT 4 FEET			

Figure A-20, Log of Trench T 14

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 15

ELEV. (MSL.) 350 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		▨		CL	**TOPSOIL** Stiff, moist, brown, fine Sandy CLAY			
2		░		SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange stain, Silty fine SANDSTONE			
					TRENCH TERMINATED AT 3 FEET			

Figure A-21, Log of Trench T 15

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
☒ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◩ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

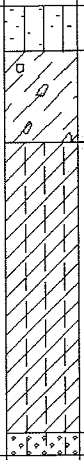
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 16

ELEV. (MSL.) **360** DATE COMPLETED **12/29/97**

EQUIPMENT **JD 555 BACKHOE**



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML/SM	**LANDSLIDE DEBRIS** Loose, dry, light brown, fine Sandy SILT/Silty fine SAND			
2				GC	Medium dense, moist, orange-brown, Clayey GRAVEL/COBBLE -Stiff, very moist, Silty CLAY lens from 2 to 3 feet			
4 6 8				CL	Very stiff, moist, light gray with orange mottling, Silty CLAY; small gravel fragments -Becomes damp and blocky with abundant cobble and continued mottling at 6 feet **-BASAL SHEAR ZONE AT 9.6 FEET**; 4-inch thick, stiff, brown clay lens with apparent residual shear fabric, concentration of 1/4-inch to 1/2-inch gravel embedded in clay			
10				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, yellowish-brown, Silty, fine to medium SANDSTONE with a trace of clay			

TRENCH TERMINATED AT 10 FEET

Figure A-22, Log of Trench T 16

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◪ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. 06021-52-01

TRENCH T 17

ELEV. (MSL.) 387 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6				CL/CH	**ALLUVIUM** Soft, very moist, brown to black, fine Sandy CLAY			
8 10				GC	Medium dense, moist, orange-brown, Clayey GRAVEL/COBBLE			
12				GC	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, moist, orange, Clayey, fine to medium Sandy GRAVEL/COBBLE CONGLOMERATE			

TRENCH TERMINATED AT 12.5 FEET

Figure A-23, Log of Trench T 17

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in general accordance with the test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected, relatively undisturbed drive samples were tested for their in-place dry density, moisture content, and shear strength characteristics. The maximum dry density and optimum moisture content and Expansion Index of selected bulk samples were determined in accordance with ASTM Test Procedure D 1557-91. Portions of the bulk samples were then remolded to selected densities and subjected to drained direct shear testing.

The results of our laboratory tests are presented in tabular and graphical forms hereinafter. The in-place dry density and moisture characteristics are presented on the exploratory borings.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557-91

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-6	Light brown, Silty, fine SAND	120.0	13.3
B2-2	Orange brown, Silty, fine to coarse SAND	127.2	10.0

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B2-2	9.4	17.6	113.3	2
B3-1	9.8	20.3	109.2	24
B4-3	12.2	29.0	101.1	73
B5-3	13.4	25.6	98.0	18

TABLE B-III
SUMMARY OF DIRECT SHEAR TEST RESULTS

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1-5	120.2	10.7	1000**	32
B2-2*	114.6	9.7	460	33

*Soil sample remolded to approximately 90 percent of maximum dry density at near optimum moisture content.

**Cohesion adjusted in slope stability analysis to 500 psf due to cementation of the sample.

C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

RHODES PROPERTY

SAN DIEGO, CALIFORNIA

PROJECT NO. 06021-52-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1. These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2. Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. It will be necessary that the Consultant provide adequate testing and observation services so that he may determine that, in his opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep him apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3. It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, and so forth, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that construction be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1. **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2. **Contractor** shall refer to the Contractor performing the site grading work.

2.3. **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4. **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5. **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6. **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7. **Geotechnical Report** shall refer to a soil report (including all addendums) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1. Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1. **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than 3/4 inch in size.

3.1.2. **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3. **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than 3/4 inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2. Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3. Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4. The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized, provided it is acceptable to the governing agency, Owner and Consultant.

3.5. Representative samples of soil materials to be used for fill shall be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6. During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

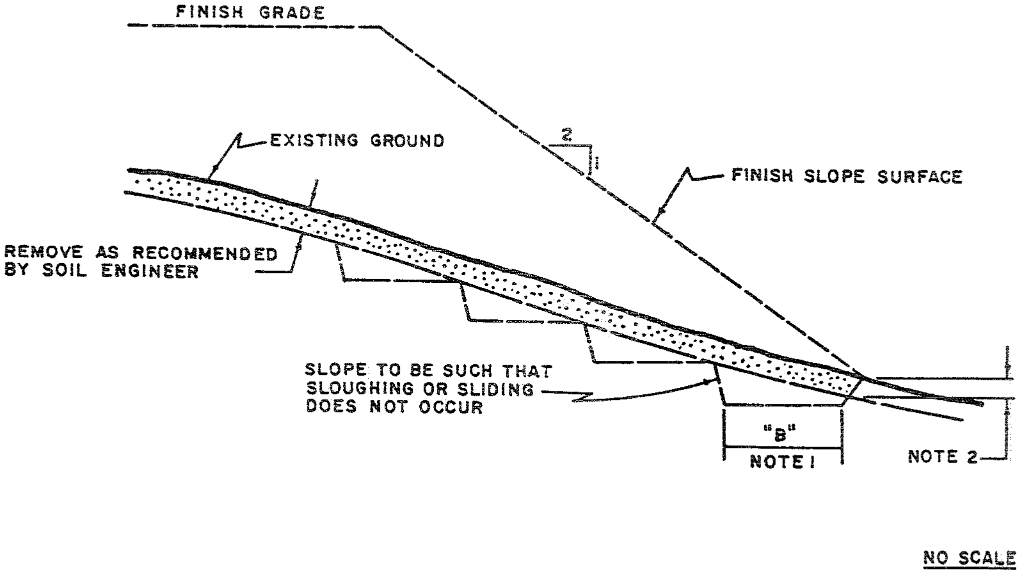
4.1. Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2 inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments which are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3. After clearing and grubbing of organic matter or other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction shall be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4. Where the slope ratio of the original ground is steeper than 6:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet wide, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the bottom key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5. After areas to receive fill have been cleared, plowed or scarified, the surface should be disced or bladed by the Contractor until it is uniform and free from large clods. The area should then be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6.0 of these specifications.

5. COMPACTION EQUIPMENT

5.1. Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2. Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1. *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1. *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2. In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D1557-91.

6.1.3. When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4. When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5. After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D1557-91. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6. Soils having an Expansion Index of greater than 50 may be used in fills if placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7. Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8. As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2. *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1. Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2. Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3. For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4. For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5. Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6. All rock placement, fill placement and flooding of approved granular soil in the windrows must be continuously observed by the Consultant or his representative.

6.3. *Rock* fills, as defined in Section 3.1.3., shall be placed by the Contractor in accordance with the following recommendations:

6.3.1. The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent, maximum slope of 5 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post--construction infiltration of water.

6.3.2. *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made will be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3. Plate bearing tests, in accordance with ASTM D1196-64, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the number of passes of the compaction equipment to be performed. If performed, a minimum of three plate bearing tests shall be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4. A representative of the Consultant shall be present during *rock* fill operations to verify that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading. In general, at least one test should be performed for each approximately 5,000 to 10,000 cubic yards of *rock* fill placed.

6.3.5. Test pits shall be excavated by the Contractor so that the Consultant can state that, in his opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

6.3.6. To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7. All *rock* fill placement shall be continuously observed during placement by representatives of the Consultant.

7. OBSERVATION AND TESTING

7.1. The Consultant shall be the Owners representative to observe and perform tests during clearing, grubbing, filling and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill shall be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test shall be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2. The Consultant shall perform random field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion as to whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

7.3. During placement of *rock* fill, the Consultant shall verify that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant shall request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. If performed, plate bearing tests will be performed randomly on the surface of the most-recently placed lift. Plate bearing tests will be performed to provide a basis for expressing an opinion as to whether the *rock* fill is adequately seated. The maximum deflection in the *rock* fill determined in Section 6.3.3 shall be less than the maximum deflection of the properly compacted *soil* fill. When any of the above criteria indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

7.4. A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

7.5. The Consultant shall observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6. Testing procedures shall conform to the following Standards as appropriate:

7.6.1. Soil and Soil-Rock Fills:

7.6.1.1. Field Density Test, ASTM D1556-82, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2. Field Density Test, Nuclear Method, ASTM D2922-81, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3. Laboratory Compaction Test, ASTM D1557-91, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test, Uniform Building Code Standard 29-2, *Expansion Index Test.*

7.6.2. Rock Fills

7.6.2.1. Field Plate Bearing Test, ASTM D1196-64 (Reapproved 1977) *Standard Method for Nonrepresentative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1. During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

8.2. After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

9.1. Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

9.2. The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

SOIL AND GEOLOGIC RECONNAISSANCE

CAMINO RUIZ
ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

PREPARED FOR

LATITUDE 33
PLANNING AND ENGINEERING
SAN DIEGO, CALIFORNIA

JUNE 2000

Project No. 06517-32-01
July 7, 2000

Latitude 33
Planning And Engineering
4180 La Jolla Village Drive, Suite 330
San Diego, California 92037

Attention: Mr. John Eardensohn

Subject: CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA
SOIL AND GEOLOGIC RECONNAISSANCE

Gentlemen:

In accordance with your authorization of our proposal (LG-98314) dated August 7, 1998, we have performed a soil and geologic reconnaissance of the subject project. The study was conducted to determine the site soil and geologic conditions, and to identify potential geologic hazards that may impact the property with respect to future development.

The accompanying report presents the findings of our preliminary study with respect to the geotechnical aspects of site development. In general, no soil or geologic conditions were encountered that would preclude development of the property as planned. The presence of potentially thick surficial deposits, and the strength characteristics of the geologic materials exposed in proposed cut slopes along the alignment will be primary considerations during future subsurface studies.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

D B Evans

David B. Evans
CEG 1860

REGISTERED GEOLOGIST
DAVID B. EVANS
#1860
CERTIFIED ENGINEERING GEOLOGIST
03/31/02
STATE OF CALIFORNIA

George Copenhaver

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GEORGE CALVIN COPENHAVER, JR.
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11/30/01
STATE OF CALIFORNIA

GCC:DBE:dmc

(6) Addressee

GEOCON
INCORPORATED

GEOTECHNICAL
CONSULTANTS

SOIL AND GEOLOGIC RECONNAISSANCE

CAMINO RUIZ
ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

PREPARED FOR

LATITUDE 33
PLANNING AND ENGINEERING
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TABLE OF CONTENTS

SOIL AND GEOLOGIC RECONNAISSANCE

1. PURPOSE AND SCOPE

The purpose of this soil and geologic reconnaissance was to identify the soil and geologic conditions at the site, determine the presence of geologic hazards (if any) and to provide preliminary geotechnical recommendations with respect to development of the proposed roadway alignment. Additional studies, including subsurface exploration and laboratory testing should be performed prior to approval of the site grading plans. The scope of our study consisted of a review of published geologic literature and in-house geotechnical reports (see *List of References* at the end of this report) and performing a site reconnaissance. Specifically, our study included the following:

- Field mapping by an engineering geologist to identify the soil and geologic units and to determine the approximate areal extent of the units.
- Review of stereoscopic aerial photographs.
- Review of the *Camino Ruiz* topographic base-map, scale 1 inch equals 100 feet, prepared by Latitude 33 Planning and Engineering, undated.

2. SITE AND PROJECT DESCRIPTION

The elongate (approximately 1,400 feet) proposed Camino Ruiz roadway extension consists of undeveloped land located north of Dormouse Road and south of the Rhodes Property in the community of Rancho Penasquitos, City of San Diego, California (see Vicinity Map, Figure No. 1). Presently, the property is undeveloped and is covered with grasses and moderately dense chaparral vegetation.

Topographically, the site consists of mesa ridges dissected by several tributary canyons draining southward into Penasquitos Canyon. Elevations range from a high of approximately 410 feet Mean Sea Level (MSL) in the northern portion of the site to a low of approximately 250 feet MSL in a the major tributary canyon drainage to Penasquitos Canyon in the southern part of the alignment.

A review of the referenced topographic map and a conceptual study map of Subarea 4 indicates the alignment of the proposed extension will consist of mass-grading the site to construct cut and fill slopes with heights on the order of 50 and 60 feet.

3. SOIL AND GEOLOGIC CONDITIONS

Six surficial soil deposits and three geologic formations were observed at the site. The surficial deposits include compacted fill, undocumented fill, topsoil, possible landslide debris, alluvium and colluvium. The geologic formations include the Quaternary-age Lindavista Formation and two Eocene sedimentary units consisting of the Stadium Conglomerate and Friars Formation. Each of the surficial deposits and formational units is discussed below in order of increasing age. Their estimated areal extent, as determined by geologic field mapping, is depicted on the Geologic Map, Figure 2 (map pocket).

3.1 Compacted Fill (Qcf)

Compacted fill soils were observed at the southern end of the proposed alignment and are associated with the existing Camino Ruiz roadway. The fill embankment includes a slope approximately 60-feet-high and is presumed to have been placed during the street and subdivision improvements to the south. Geotechnical investigation along the fill margins will be necessary to verify its suitability for support of additional structural fill and/or future improvements.

3.2 Undocumented Fill (Qudf)

Undocumented fill was observed in limited extent within a sewer easement and associated dirt access road along the major canyon drainage that parallels the proposed roadway extension. It is assumed that this material is beyond the proposed road alignment and will not impact planned development.

3.3 Topsoil (Unmapped)

Topsoils generally blanket the site and typically consist of clayey to silty sands. Topsoil overlying the Stadium Conglomerate are generally less expansive than topsoil overlying the Linda Vista or Friars Formations. The topsoil is highly compressible and will require removal and recompaction. Due to the expansive nature and poor pavement support characteristics of these soils, placement within deeper fill areas is recommended.

3.4 Colluvium (Qc)

Colluvial deposits were observed in the central portion of the alignment and form significant accumulations along slopes and at the base of canyon slopes adjacent to the proposed roadway. Typically, the colluvium is comprised of soft to stiff, sandy clays and clayey sands with cobble sized rock fragments. The thickness of the colluvium is estimated to vary from approximately 5 to 10 feet, or greater, based upon geomorphic expressions. The colluvium is compressible and unsuitable in its present condition for support of structural fill and/or loading. Removal and recompaction will be required within areas of planned development.

3.5 Alluvium (Qal)

Alluvial deposits exist within the tributaries and main canyon and are anticipated to consist predominately of clayey sands and sandy clays with abundant cobbles and boulders. The thickness of the alluvium is anticipated to be significantly greater in the major drainage paralleling the proposed roadway alignment. Where structural improvements are proposed in areas underlain by shallow alluvium, remedial grading in the form of complete removal and recompaction will be necessary. Remedial grading within the deeper alluvial deposits may be controlled by the presence of groundwater and/or by the in situ condition of the materials. A more detailed evaluation of the alluvium should be performed during future geotechnical studies if development plans extend into the main drainage.

3.6 Landslide Debris (Qls)

A suspected landslide deposit was mapped in the northern portion of the alignment. Observation of the topographic expressions, and knowledge of surrounding geology (see *List of References*) suggest that the potential for landslides or adverse geologic structure related to the Stadium/Friars Formation contact exists. Landslides and/or unfavorable structure associated with this contact would impact the proposed development. Typical mitigation for these features include complete removal and recompaction, and/or buttress fills to provide stabilization. Additional studies including exploratory borings and trenches should be performed to confirm the presence and limits of suspected landslide deposit as well as to provide recommendations for mitigation of adverse geologic features, if present.

3.7 Lindavista Formation (Qln)

Dense to very dense, reddish brown, gravelly to cobbly, silty, fine to medium sandstone of the Quaternary-age Lindavista Formation occurs on top of the mesa ridges on the west side of the proposed road extension. This formation typically possesses good shear strength and low expansive characteristics in either a natural or properly compacted state. It is not unusual, however, to encounter partially to well cemented zones within this formation that will require a very heavy effort to excavate.

3.8 Stadium Conglomerate (Tst)

Very dense, cobble conglomerate of the Stadium Conglomerate Formation represents the most extensive formation underlying the anticipated road extension. Typically, this deposit is comprised of cobbles varying in size from approximately 3 to 12 inches embedded in a silty to clayey sand matrix. The Stadium Conglomerate is often partially to well cemented and it is common to encounter isolated lenses of very cemented materials that require significant effort to excavate. This sedimentary deposit possesses high shear strength characteristics in either a natural or properly compacted condition. Cut and fill slopes within these materials graded at inclinations of 2:1 or flatter should possess adequate stability. This formation is considered suitable for support of fill and/or structural loads in its present condition.

3.9 Friars Formation (Tf)

This unit, comprised of sandy claystones and clayey sandstones, occurs at elevations below approximately 300 feet MSL and is not anticipated to be encountered in major excavations for the roadway extension. Friars claystones are typically weakly cemented, with moderate to high expansivity and will require either selective grading and/or stabilization measures if exposed in excavations. Excavations for fill slope keyways along proposed embankments within the Friars Formation may require deepening to expose suitable foundation materials. A suspected landslide mapped in the northern portion of the site appears to have its base within the upper portion of the Friars Formation, near the contact with Stadium Conglomerate (see Geologic Map, Figure 2). Landslides are discussed in more detail under *Geologic Hazards.*

4. GEOLOGIC STRUCTURE

The major geologic formations are generally comprised of massive sandstone and conglomerate units with bedding attitudes that are nearly horizontal. The regional dip is estimated to be 4 to 5 degrees toward the south and west, but can vary locally several degrees in other directions. The contact between the Stadium Conglomerate and Friars Formation occurs at an approximate elevation of 300 feet MSL and is not anticipated to impact major cut slopes along the proposed roadway extension. It should be noted, however, that weak zones within the Friars Formation may impact the stability of fill embankments placed within these zones. Future subsurface studies will evaluate these issues.

Review of the City of San Diego *Seismic Safety Study, Geologic Hazards and Faults,* 1995 edition, indicated that the majority of the site is situated within a Hazard Categories 23 and 53; level or sloping terrain, unfavorable geologic structure with a low to moderate risk. The lower eastern portion of the alignment is situated with a Hazard Category of 23 (Slide Prone Formations); Friars Formation with a neutral or favorable geologic structure.

5. GROUNDWATER

Surface groundwater and spring-seeps were observed within the major canyon drainage during our site reconnaissance. Dependent upon the time of year, running water may occur within the stream bed and it is likely that a permanent groundwater table exists within the deeper alluvium within this canyon. It is also likely that during the rainy season, shallow perched groundwater conditions can develop within the shallower alluvial deposits in the tributary canyons. It should be anticipated that if in-filling of canyons or ravines is planned, the construction of subdrains to relieve the potential buildup of hydrostatic pressures will be required. Provided that the subdrains are constructed, groundwater is not anticipated to adversely impact the proposed project development.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

Based upon a review of published geologic literature, and observations during the site reconnaissance, it is the opinion of Geocon Incorporated that no known active faults exist on the site. Review of the *City of San Diego, Seismic Safety Study, Geologic Hazards and Faults* (1995 edition*)* indicates the presence of a fault located over one mile north of the site. The fault does not extend close to the proposed roadway alignment.

The nearest active fault to the site is the Rose Canyon Fault located approximately 8 miles to the west. Portions of the Rose Canyon Fault are located within an Alquist-Priolo Earthquake Fault zone. Historically, the Rose Canyon fault has exhibited low seismicity with respect to earthquakes in excess of Magnitude 5.0 or greater. Major earthquakes occurring on the Rose Canyon Fault or other regional active faults could subject the site to moderate to severe ground shaking within the life span of the proposed structures.

Table 6.1 presents a list of significant active faults, their distance from the site, and a summary of potential ground shaking effects. The information presented on Table 6.1 was derived from an analysis using EQFAULT, a computer program that performs deterministic analyses based upon distances from the site to known earthquake faults that have been digitized into an earthquake catalog. Attenuation relationships by Geomatrix (1994) were used to estimate the maximum credible and maximum probable peak site accelerations.

TABLE 6.1
DETERMINISTIC SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Credible Magnitude	Maximum Credible Peak Site Acc (g)	Maximum Probable Magnitude	Maximum Probable Peak Site Acc (g)
Rose Canyon	8	6.9	.27	5.7	.13
Coronado Bank	21	7.4	.17	6.3	.08
Newport Inglewood	22	6.9	.12	5.8	.05
Elsinore-Julian	28	7.1	.10	6.4	.06
Elsinore-Temecula	30	6.8	.08	6.3	.05

6.2 Landslides

The suspected landslide mapped during this reconnaissance was identified on the basis of geomorphic and stratigraphic relationships that suggest a potential failure surface within the upper portion of the Friars Formation. The landslide, if present, is located near the tentatively proposed alignment and may require mitigation to stabilize the area as well as to remove compressible soil deposits.

6.3 Liquefaction

The potential for liquefaction of the site subsoils during a strong earthquake is limited to those soils which are in a relatively loose, unconsolidated condition and located below the groundwater table. It is our opinion that such conditions are minor or nonexistent along the western side of the site, but could exist within deeper alluvial deposits; especially within the main canyon drainage bordering the east side of the proposed alignment. In the event that embankments are planned to extend into the main alluvial drainage, liquefaction potential will be evaluated during future subsurface studies.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 In our opinion, no soil or geologic conditions exist at the site that would preclude the development of the property as presently planned. Preliminary grading recommendations are presented herein for planning purposes. Detailed recommendations can be provided in future geotechnical studies based upon site specific information obtained from subsurface studies.

7.1.2 The site is underlain by surficial units that include undocumented fill soils, compacted fill soils, topsoils, colluvium, alluvium and landslide debris. With the exception of the compacted fill, these materials are unsuitable in their present condition for support of fill and/or structural loads and will require remedial grading.

7.1.3 A potential landslide deposit was mapped in the northern portion of the site. The suspected landslide is within, or near, the proposed roadway extension and will require further evaluation. Buttressing and/or complete removal and recompaction of this deposit, if present, may be necessary.

7.1.4 The formational units on site (Lindavista and Stadium Conglomerate) may contain highly cemented zones that may be difficult to excavate. Oversize concretions that may be generated during excavation of these cemented zones will require special grading provisions and placement techniques for incorporation into the compacted fills. The contact zone between the Stadium Conglomerate and the Friars Formation may impact fill-slope stability and should be delineated during future geotechnical studies.

7.2 Grading

7.2.1 It is recommended that as grading and improvement plans are developed, a geotechnical investigation be performed to further delineate and evaluate the site geology and to determine the engineering characteristics of the site soil materials.

7.2.2 The surficial soils within areas of planned development will require removal and recompaction.

7.2.3 Highly expansive soils encountered during grading should be placed within deeper fills away from slopes and street subgrade areas.

7.2.4 Oversize rock or cemented chunks may be generated during excavations within the formational units. Oversize rock should be kept at least 10 feet below proposed finish grade elevations or 3 feet below the deepest utility, which ever is greater. All oversize materials should be placed in accordance with the recommendations in the *Recommended Grading Specifications* in Appendix A of this report.

7.2.5 All fill (including scarified ground surfaces and backfill) should be compacted to at least 90 percent of laboratory maximum dry density as determined by ASTM Test Procedure D-1557-91; at or slightly above optimum moisture content. Fill areas with in-place density test results indicating soil moisture contents less than optimum will require additional moisture conditioning prior to placing additional fill.

7.2.6 In general, cut or fill slopes constructed at inclinations of 2:1 (horizontal:vertical) constructed of sandy materials derived from the formational units should have adequate factors of safety against both deep seated and surficial instability for the proposed slope heights. Adversely oriented fractures, joints, clay seams or remolded clay seams exposed in cut slopes may potentially affect cut slope stability and may require stabilization measures such as earth buttresses or stability fills. Cut slopes should be observed during grading by an engineering geologist to determine if adverse conditions exist. Recommendations can be provided at that time, if necessary.

7.3 Future Project Plans

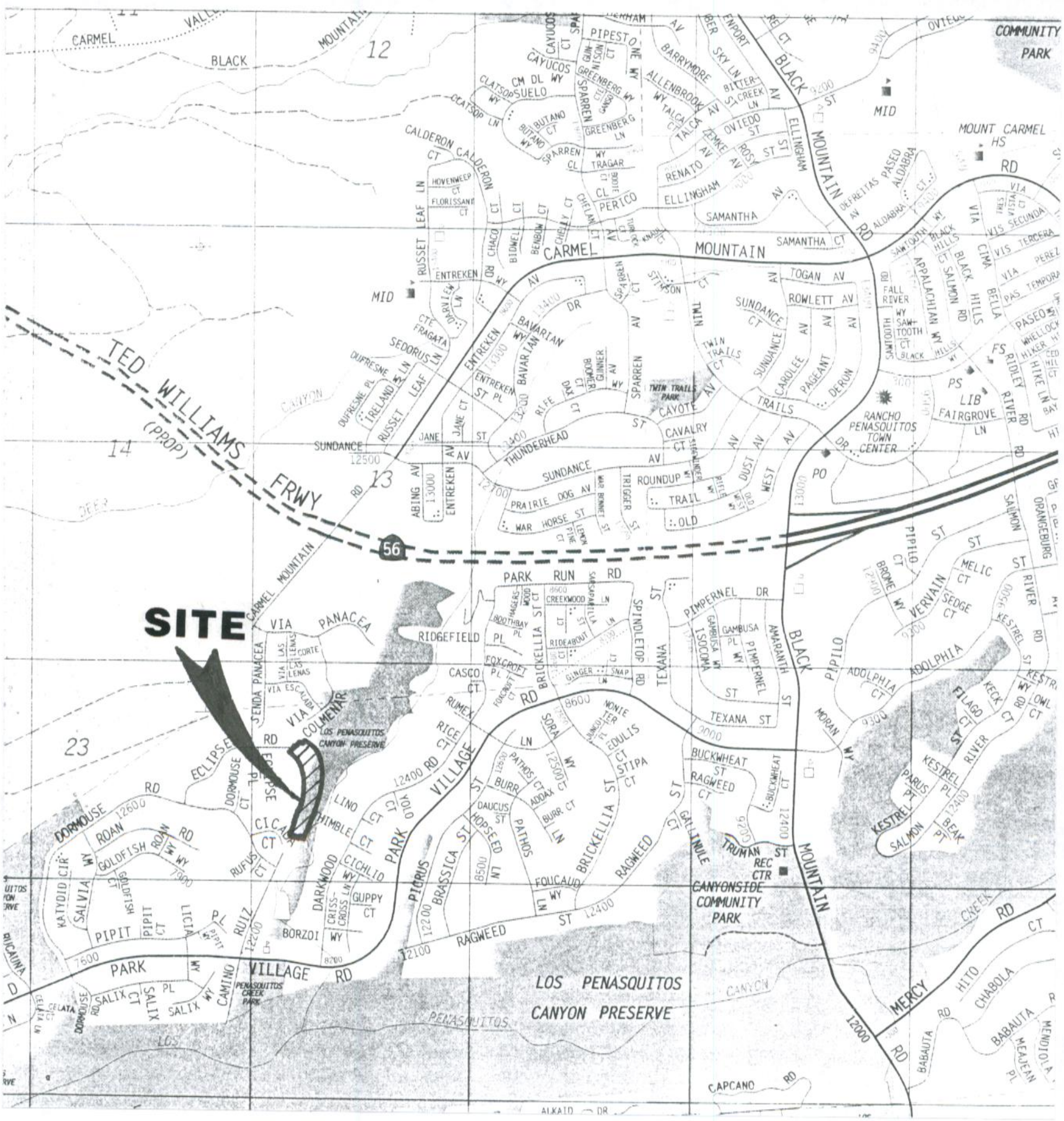
7.3.1 Prior to finalization of the grading plans for the property, a geotechnical investigation addressing the specific grading plans should be performed. The investigation should provide site specific grading recommendations, recommendations for mitigation of adverse soil conditions (i.e. compressible surficial soil deposits, landslides, slope stabilization, etc.) and preliminary foundation design criteria.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



SOURCE : 2000 THOMAS BROTHERS MAP
SAN DIEGO COUNTY, CALIFORNIA

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NO SCALE

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VICINITY MAP

CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

GCC / AML		DSK / D000D	DATE	PROJECT NO. 6517 - 32 - 01	FIG. 1

1VIC1

APPENDIX A

APPENDIX A

RECOMMENDED GRADING SPECIFICATIONS

FOR

CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

PROJECT NO: 06527-32-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1. These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2. Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. It will be necessary that the Consultant provide adequate testing and observation services so that he may determine that, in his opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep him apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3. It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, and so forth, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that construction be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1. **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2. **Contractor** shall refer to the Contractor performing the site grading work.

2.3. **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4. **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5. **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6. **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7. **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1. Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1. **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than 3/4 inch in size.

3.1.2. **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3. **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than 3/4 inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2. Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3. Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4. The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized, provided it is acceptable to the governing agency, Owner and Consultant.

3.5. Representative samples of soil materials to be used for fill shall be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6. During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

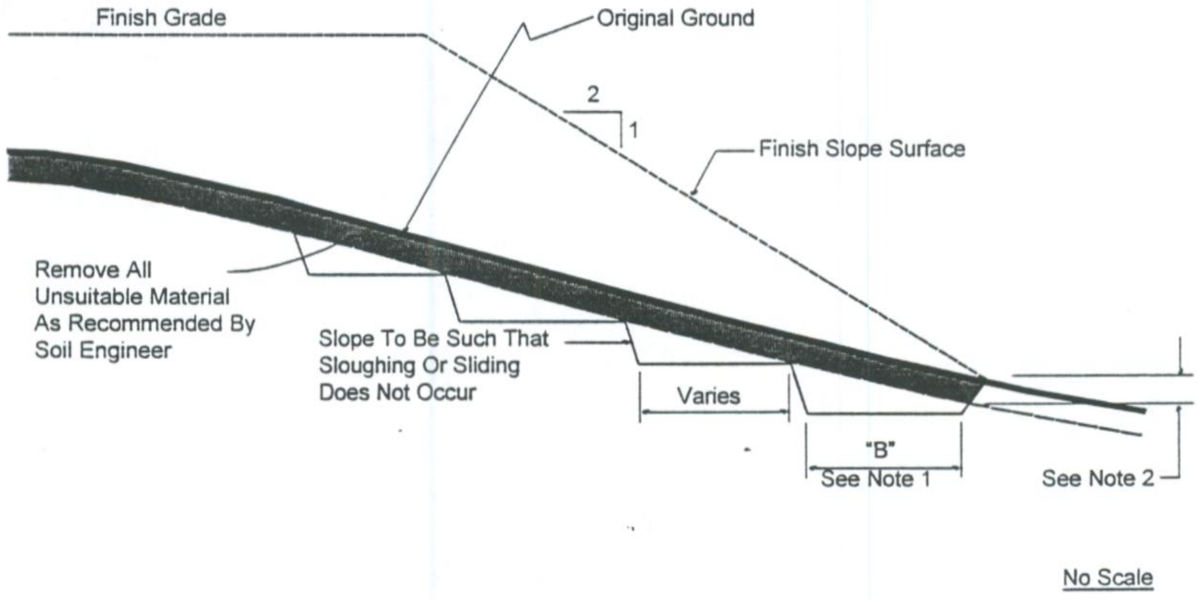
4.1. Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2 inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments which are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3. After clearing and grubbing of organic matter or other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction shall be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4. Where the slope ratio of the original ground is steeper than 6:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet wide, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the bottom key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5. After areas to receive fill have been cleared, plowed or scarified, the surface should be disced or bladed by the Contractor until it is uniform and free from large clods. The area should then be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6.0 of these specifications.

5. COMPACTION EQUIPMENT

5.1. Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2. Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1. *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1. *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2. In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D1557-91.

6.1.3. When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4. When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5. After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D1557-91. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6. Soils having an Expansion Index of greater than 50 may be used in fills if placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7. Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8. As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2. *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1. Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2. Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3. For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4. For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5. Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6. All rock placement, fill placement and flooding of approved granular soil in the windrows must be continuously observed by the Consultant or his representative.

6.3. *Rock* fills, as defined in Section 3.1.3., shall be placed by the Contractor in accordance with the following recommendations:

6.3.1. The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent, maximum slope of 5 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2. *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made will be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3. Plate bearing tests, in accordance with ASTM D1196-64, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the number of passes of the compaction equipment to be performed. If performed, a minimum of three plate bearing tests shall be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4. A representative of the Consultant shall be present during *rock* fill operations to verify that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading. In general, at least one test should be performed for each approximately 5,000 to 10,000 cubic yards of *rock* fill placed.

6.3.5. Test pits shall be excavated by the Contractor so that the Consultant can state that, in his opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

6.3.6. To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7. All *rock* fill placement shall be continuously observed during placement by representatives of the Consultant.

7. OBSERVATION AND TESTING

7.1. The Consultant shall be the Owners representative to observe and perform tests during clearing, grubbing, filling and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill shall be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test shall be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2. The Consultant shall perform random field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion as to whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

7.3. During placement of *rock* fill, the Consultant shall verify that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant shall request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. If performed, plate bearing tests will be performed randomly on the surface of the most-recently placed lift. Plate bearing tests will be performed to provide a basis for expressing an opinion as to whether the *rock* fill is adequately seated. The maximum deflection in the *rock* fill determined in Section 6.3.3 shall be less than the maximum deflection of the properly compacted *soil* fill. When any of the above criteria indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

7.4. A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

7.5. The Consultant shall observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6. Testing procedures shall conform to the following Standards as appropriate:

7.6.1. Soil and Soil-Rock Fills:

7.6.1.1. Field Density Test, ASTM D1556-82, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2. Field Density Test, Nuclear Method, ASTM D2922-81, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3. Laboratory Compaction Test, ASTM D1557-91, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test, Uniform Building Code Standard 29-2, *Expansion Index Test.*

7.6.2. Rock Fills

7.6.2.1. Field Plate Bearing Test, ASTM D1196-64 (Reapproved 1977) *Standard Method for Nonrepresentative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1. During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

8.2. After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

9.1. Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

9.2. The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *City of San Diego, Seismic Safety Study, Geologic Hazards And Faults,* sheet 43, Development Services Department, 1995 edition.

2. *Landslide Hazards in the Northern Part of The San Diego Metropolitan Area, San Diego County, California* Delmar Quadrangle, California Divisions of Mines and Geology, Open File Report 95-04, 1995.

3. *Preliminary Fault Activity Map of California,* California Division of Mines And Geology, Open File report 92-03, 1992, and revised map dated 1994.

4. *Geology of The San Diego Metropolitan Area, California,* California Division of Mines And Geology, <u>Bulletin 200</u> (1975).

5. *Soil and Geologic Reconnaissance for the Shaw Subdivision San Diego, California,* Geocon Incorporated, July 5, 1990.

6. *Soil and Geologic Investigations for Fairbanks Highlands, San Diego, California,* Geocon Incorporated, September 21, 1989.

7. *Soil and Geologic Reconnaissance for Black Mountain Ranch, San Diego, California,* Geocon Incorporated, October 16, 1989, rev. May 9, 1991.

8. *Geotechnical Investigation for Scarcia-Reed Property, San Diego, California,* Geocon Incorporated, November 13, 1998.

9. *Soil and Geologic Reconnaissance for Future Urbanizing Area—Subarea IV Property, San Diego, California,* prepared by Geocon, Incorporated, dated May 10, 1993.

10. *The Rose Canyon Fault Zone Southern California,* California Division of Mines And Geology, Open file report, 93-02, 1993.

11. *Probabilistic Seismic Hazard Assessment for the State of California,* California Division of Mines And Geology, Open file report 96-08, uses Open-File Report 96-706, 1996.

12. Aerial photographs, United States Department of Agriculture, AXN-3M-181 and AXN-3M-182, 1953.

13. Allen, C. R., *et al.*, *Relationship Between Seismicity and Geologic Structure in the Southern California Region,* Seismic Society of America, Bulletin V.55, No. 4.

14. *Geotechnical Investigation for Rhodes Property, San Diego, California,* Geocon Incorporated, July 2, 1998.

GEOCON LEGEND

Qcf	COMPACTED FILL
Qudf	UNDOCUMENTED FILL
Qls	POSSIBLE LANDSLIDE DEBRIS
Qal	ALLUVIUM
Qc	COLLUVIUM
Qln	LINDAVISTA FORMATION
Tst	STADIUM CONGLOMERATE (Dotted Where Buried)
Tf	FRIARS FORMATION (Dotted Where Buried)
?⁀‿	APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
♀	SPRING, SEEPS, SURFACE WATER

GEOLOGIC MAP
CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 100'
DATE 07-07-00
PROJECT NO. 06517 - 32 - 01
FIGURE 2
SHEET 1 OF 1

CAMINO RUIZ

JN 352.20 SCALE: 1"=100'

Latitude 33
Planning and Engineering
4180 La Jolla Village Dr., Suite 330
La Jolla, CA 92037
619-552-0033 • Fax 619-552-0756

SUPPLEMENTAL SOIL AND GEOLOGIC RECONNAISSANCE

CAMINO RUIZ ROADWAY EXTENSION SAN DIEGO, CALIFORNIA

PREPARED FOR

LATITUDE 33
PLANNING AND ENGINEERING
SAN DIEGO, CALIFORNIA

MARCH 16, 2001

SUPPLEMENTAL
SOIL AND GEOLOGIC RECONNAISSANCE

CAMINO RUIZ
ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
CONSULTANTS

PREPARED FOR

LATITUDE 33
PLANNING AND ENGINEERING
SAN DIEGO, CALIFORNIA

MARCH 16, 2001

Project No. 06517-32-02
March 16, 2001

Latitude 33
Planning And Engineering
4180 La Jolla Village Drive, Suite 330
San Diego, California 92037

Attention: Mr. John Eardensohn

Subject: CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA
SUPPLEMENTAL SOIL AND GEOLOGIC RECONNAISSANCE

Gentlemen:

In accordance with your authorization of our proposal (LG-00692) dated December 14, 2000, we have performed a supplemental soil and geologic reconnaissance of the subject project. The study included a limited subsurface investigation to evaluate the site soil and geologic conditions and potential geologic hazards that were identified in our original reconnaissance report dated July 7, 2000. The primary focus of this study was to determine if geotechnical mitigation beyond the currently proposed roadway envelope would be required.

The accompanying report presents the findings of our supplemental study with respect to the geotechnical aspects of site development as planned. In general, no soil or geologic conditions were encountered that would result in geotechnical mitigation beyond the proposed roadway limits.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

David B. Evans
CEG 1860

REGISTERED GEOLOGIST
DAVID B. EVANS
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03/31/02
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George Copenhaver

George C. Copenhaver
CEG 86

REGISTERED GEOLOGIST
GEORGE CALVIN
COPENHAVER, JR.
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GEOLOGIST
11/30/01
STATE OF CALIFORNIA

GCC:DBE:dmc

(6/del) Addressee

GEOCON
INCORPORATED

GEOTECHNICAL CONSULTANTS

Project No. 06517-32-02
March 16, 2001

Latitude 33
Planning And Engineering
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TABLE OF CONTENTS

SUPPLEMENTAL SOIL AND GEOLOGIC RECONNAISSANCE

1. PURPOSE AND SCOPE

A prior reconnaissance level study was performed along the proposed Camino Ruiz Road alignment and is presented in our report entitled *Soil And Geologic Reconnaissance, Camino Ruiz Roadway Extension, San Diego, California*, dated July 7, 2000. During the study, several potential geologic conditions were identified that warranted future investigation as the roadway design progressed (i.e.- a potential landslide, potentially thick surficial deposits, potentially weak materials exposed in proposed cut slopes).

The purpose of this study was to investigate these items on an environmental impact level and determine if geotechnical mitigation beyond the currently proposed roadway envelope would be required. Additional studies, including subsurface exploration and laboratory testing should be performed prior to approval of the site grading plans. The scope of this supplemental study consisted of the excavation of 18 exploratory test pits to depths of up to 14 feet. The approximate locations of the exploratory excavations are depicted on the Geologic Map, Figure 2. Specifically, our study included the following:

- Field mapping and logging of trenches by an engineering geologist to identify the soil and geologic units and to determine the approximate areal extent of the units.
- Review of stereoscopic aerial photographs.
- Review of the *Camino Ruiz* topographic base-map, scale 1 inch equals 100 feet, prepared by Latitude 33 Planning and Engineering, undated.

2. SITE AND PROJECT DESCRIPTION

The elongate (approximately 1,400 feet) proposed Camino Ruiz roadway extension consists of undeveloped land located north of Dormouse Road and south of the Rhodes Property in the community of Rancho Penasquitos, City of San Diego, California (see Vicinity Map, Figure No. 1). Presently, the property is undeveloped and is covered with grasses and moderately dense chaparral vegetation.

Topographically, the site consists of mesa ridges dissected by several tributary canyons draining southward into Penasquitos Canyon. Elevations range from a high of approximately 419 feet Mean Sea Level (MSL) in the northern portion of the site to a low of approximately 254 feet MSL in a the major tributary canyon drainage to Penasquitos Canyon along the southern part of the alignment.

A review of the referenced topographic map indicates the alignment of the proposed extension will consist of mass-grading the site to construct cut and fill slopes with heights on the order of 50 and 60 feet, respectively.

3. SOIL AND GEOLOGIC CONDITIONS

Six surficial soil deposits and four geologic formations were observed at the site. The surficial deposits include compacted fill, undocumented fill, topsoil, possible landslide debris, alluvium and colluvium. The geologic formations include an alluvial Terrace Deposit, the Quaternary-age Lindavista Formation and two undifferentiated Eocene sedimentary units consisting of the Stadium Conglomerate and Friars Formation. Each of the surficial deposits and formational units is discussed below in order of increasing age. Their estimated areal extent, as determined by geologic field mapping, is depicted on the Geologic Map, Figure 2 (map pocket).

3.1 Compacted Fill (Qcf)

Compacted fill soils were observed at the southern end of the proposed alignment and are associated with the existing Camino Ruiz roadway. The fill embankment includes a slope approximately 60-feet-high and is presumed to have been placed during the street and subdivision improvements to the south. Geotechnical investigation along the fill margins will be necessary to verify its suitability for support of additional structural fill and/or future improvements.

3.2 Undocumented Fill (Qudf)

Undocumented fill was observed in limited extent within a drainage easement and associated distribution vault that debouches above the proposed alignment. The fill is present in a canyon drainage approximately midway along the proposed roadway extension. It is assumed that this material is beyond the proposed road alignment and should not affect development.

3.3 Topsoil (Unmapped)

The site is generally blanketed with topsoils that typically consist of one or two feet of clayey to gravelly sands. Topsoil above the Stadium Conglomerate are generally less expansive than topsoil above the Linda Vista or claystone of Friars Formation. These materials are highly compressible and will require removal and recompaction. Due to the expansive nature and poor pavement support characteristics of these soils, placement within deeper fill areas is recommended.

3.4 Colluvium (Qc)

Colluvial deposits were observed in the drainage areas of the alignment and form shallow to moderate accumulations along slopes and at the base of canyon slopes adjacent to the proposed roadway. Typically, the colluvium is indistinguishable from topsoil and is comprised of soft to stiff, porous, sandy clays and clayey sands with cobble sized rock fragments. The thickness of the colluvium is estimated to vary from approximately 2 to 3 feet thick. The colluvium is compressible and unsuitable in its present condition for support of structural fill and/or loading. Removal and recompaction will be required within areas of planned development.

3.5 Alluvium (Qal)

Alluvial deposits exist within the tributaries and main canyon and are anticipated to consist predominately of loose, dark brown to olive, clayey sands and sandy clays with abundant cobbles and boulders. The thickness of the alluvium is anticipated to be on the order of 6 to 10 feet in the major drainages crossed by the proposed roadway alignment (see test pits T-2, T-6, T-11, and T-12). Where structural improvements are proposed in areas underlain by alluvium, remedial grading in the form of complete removal and recompaction will be necessary. Remedial grading within deeper alluvial deposits may be controlled by the presence of groundwater and/or by the in situ condition of the materials. A more detailed evaluation of the alluvium should be performed during future geotechnical studies if development plans extend further east into the main drainage.

3.6 Landslide Debris (Qls)

The referenced reconnaissance study identified a suspected landslide deposit adjacent to the northern portion of the alignment. Exploratory test pits T-8, T-9, and T-10 were advanced well beyond the proposed grading prism in this area and encountered intact sandstone and conglomerate of the Stadium Conglomerate formation. Based on topographic interpretation, a possible landslide is mapped further to the east of our trenches, however, if it exists, it posses no risk to the planned roadway improvement.

3.7 Terrace Deposits (Qt)

This unit was encountered in test pits T-3, T-6, and T-15 along the southern portion of the alignment approximately between elevations 260 and 330 MSL. The deposit consists of medium-dense or stiff reddish-brown, gravelly, clayey sand to sandy clay. In some locations, such as trenches T-3 and T-15, the upper 3 to 5 feet of the deposit is more clayey and weathered consisting of a soft sandy clay. This portion is likely highly expansive and subject to compression under the load of an embankment. Selective removal and compaction will be required within these areas prior to the placement of structural fill. Unweathered Terrace Deposits typically posses good shear strength and low-expansive character.

3.8 Lindavista Formation (Qln)

Dense to very dense, reddish brown, gravelly to cobbly, silty, fine to medium sandstone of the Quaternary-age Lindavista Formation occurs on top of the mesa along the west side of the proposed road extension. This formation typically possesses good shear strength and low expansive characteristics in either a natural or properly compacted state. It is not unusual, however, to encounter partially to well cemented zones within this formation that will require a very heavy effort to excavate.

3.9 Stadium Conglomerate/Friars Formation (Tst/Tf)

The Stadium Conglomerate and Friars Formation within the project area was observed to be interbedded. This relationship is evidenced in test pits T5, T9 and T14 where the units appear to be laterally discontinuous. For this reason, the formations are mapped as a single undifferentiated unit (see Geologic Map, Figure 2).

The majority of the proposed roadway alignment should expose characteristic Stadium Conglomerate units consisting of massive, very dense, coarse conglomerate and sandstones above an elevation of approximately 290 MSL. Below this elevation, primarily weathered and fractured olive to gray, silty claystone materials characteristic of the Friars Formation (or Delmar Formation) were encountered. Excavations for fill slope keyways along proposed embankments within weathered claystone members may require deepening to expose suitable foundation materials. The claystone units are not anticipated in major cut slope excavations for the roadway extension except as discontinuous lenses. These lenses, if they occur, should be relatively limited and are not expected to adversely affect the gross stability of the cut slopes. This will be confirmed during future studies.

4. GEOLOGIC STRUCTURE

The major geologic formations are generally comprised of massive sandstone and conglomerate units with bedding attitudes that are nearly horizontal. The regional dip is estimated to be 4 to 5 degrees toward the south and west, but can vary locally several degrees in other directions. The transition between the granular undifferentiated Stadium Conglomerate and Friars Formation, and the lower continuous claystone members occurs at an elevation below 290 feet. Future subsurface studies and continuous observation of the slope excavations by an engineering geologist during grading will better define the structural and stratigraphic relationships between these units.

Review of the City of San Diego *Seismic Safety Study, Geologic Hazards and Faults,* 1995 edition, indicated that the majority of the site is situated within a Hazard Categories 23 and 53; level or sloping terrain, unfavorable geologic structure with a low to moderate risk. The lower eastern portion of the alignment has been assigned a Hazard Category of 23 (Slide Prone Formations); Friars Formation with a neutral or favorable geologic structure.

5. GROUNDWATER

Saturated soil and potential spring-seep areas were noted during our site reconnaissance within the main crosscutting canyon drainage along the central portion of the proposed alignment (vicinity of test pit T-6). Dependent upon the time of year, a significant amount of water may also occur within this drainage particularly where the storm drain outfall structure from the subdivision to the west discharges into the stream bed. It is also likely that during the rainy season, shallow perched groundwater conditions are present within the shallower alluvial deposits in other tributary canyons along the alignment. It should be anticipated that if in-filling of canyons or ravines is planned, the construction of subdrains beneath the embankments will be required to preclude the potential buildup of hydrostatic pressures. Provided that the subdrain systems are constructed, groundwater is not anticipated to adversely impact the proposed project development.

6. GEOLOGIC HAZARDS

6.1 Faulting and Seismicity

Based upon a review of published geologic literature, and observations during the site reconnaissance, it is the opinion of Geocon Incorporated that no known active faults exist on the site. Review of the *City of San Diego, Seismic Safety Study, Geologic Hazards and Faults* (1995 edition*)* indicates the presence of a fault located over one mile north of the site. The fault does not extend close to the proposed roadway alignment.

The nearest active fault to the site is the Rose Canyon Fault located approximately 8 miles to the west. Portions of the Rose Canyon Fault are located within an Alquist-Priolo Earthquake Fault zone. Historically, the Rose Canyon fault has exhibited low seismicity with respect to earthquakes in excess of Magnitude 5.0 or greater. Major earthquakes occurring on the Rose Canyon Fault or other regional active faults could subject the site to moderate to severe ground shaking within the life span of the proposed improvements.

Table 6.1 presents a list of significant active faults, their distance from the site, and a summary of potential ground shaking effects. The information presented on Table 6.1 was derived from an analysis using EQFAULT, a computer program that performs deterministic analyses based upon distances from the site to known earthquake faults that have been digitized into an earthquake catalog. Attenuation relationships by Geomatrix (1994) were used to estimate the maximum credible and maximum probable peak site accelerations.

TABLE 6.1
DETERMINISTIC SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Credible Magnitude	Maximum Credible Peak Site Acc (g)	Maximum Probable Magnitude	Maximum Probable Peak Site Acc (g)
Rose Canyon	8	6.9	.27	5.7	.13
Coronado Bank	21	7.4	.17	6.3	.08
Newport Inglewood	22	6.9	.12	5.8	.05
Elsinore-Julian	28	7.1	.10	6.4	.06
Elsinore-Temecula	30	6.8	.08	6.3	.05

6.2 Landslides

The suspected landslide mapped during this study, and the previous reconnaissance was identified on the basis of geomorphic and stratigraphic interpretations. The interpretation suggests that a potential failure surface exists below transition zone into claystone members near the base of the undifferentiated Stadium-Friars Formation. The landslide, if present, is located a substantial distance away from the proposed alignment and poses no impact to the project.

6.3 Liquefaction

The potential for liquefaction of the site subsoils during a strong earthquake is limited to those materials which are in a relatively loose, unconsolidated condition and located below the groundwater table. Based on this reconnaissance study, it is our opinion that the potential for such conditions is remote provided the recommended remedial grading is performed.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 In our opinion, no soil or geologic conditions exist at the site that would preclude the development of the property as presently planned. In addition, the typical remedial grading procedures recommended for site development will occur within the planned alignment and mitigation beyond the anticipated roadway limits should not be required. Preliminary grading recommendations are presented herein for planning purposes. Detailed recommendations can be provided in future geotechnical studies based upon site-specific information obtained from subsurface studies and inspection during construction.

7.1.2 The site is underlain by surficial units that include undocumented fill soils, compacted fill soils, topsoils, colluvium, and alluvium. With the exception of the compacted fill, these materials are unsuitable in their present condition for support of fill and/or structural loads and will require remedial grading. In addition, the upper weathered portions of the Terrace Deposits will also require remedial grading.

7.1.3 A suspected landslide deposit was mapped in the northern portion of the site. If it exists, the landslide is substantially beyond the proposed roadway extension and will pose no impact to the project.

7.1.4 The older, granular formational units on site (Lindavista and Stadium Conglomerate) may contain highly cemented zones that may be difficult to excavate. Oversize concretions that may be generated during excavation of these cemented zones will require special grading provisions and placement techniques for incorporation into the compacted fills. Continuous claystone members, if present, as well as the clayier surficial portions of terrace deposits may impact surficial slope stability and should be evaluated during future geotechnical studies. Typical stability fill embankments would be recommended in the event that these conditions are encountered.

7.2 Grading

7.2.1 It is recommended that as grading and improvement plans are developed, a geotechnical investigation be performed to further delineate and evaluate the site geology and to determine the engineering characteristics of the site soil materials.

7.2.2 The surficial soils within areas of planned development will require removal and recompaction.

7.2.3 Highly expansive soils encountered during grading should be placed within deeper fills away from slopes and street subgrade areas.

7.2.4 Oversize rock or cemented chunks may be generated during excavations within the formational units. Oversize rock should be kept at least 10 feet below proposed finish grade elevations or 3 feet below the deepest utility, which ever is greater. All oversize materials should be placed in accordance with the recommendations in the *Recommended Grading Specifications* in Appendix A of this report.

7.2.5 All fill (including scarified ground surfaces and backfill) should be compacted to at least 90 percent of laboratory maximum dry density as determined by ASTM Test Procedure D-1557-91; at or slightly above optimum moisture content. Fill areas with in-place density test results indicating soil moisture contents less than optimum will require additional moisture conditioning prior to placing additional fill.

7.2.6 In general, cut or fill slopes constructed at inclinations of 2:1 (horizontal:vertical) constructed of sandy materials derived from the formational units should have adequate factors of safety against both deep seated and surficial instability for the proposed slope heights. Although not anticipated based on this study, adversely oriented fractures, joints, or remolded clay seams exposed in cut slopes may potentially affect cut slope stability and may require stabilization measures such as earth buttresses or stability fills. Cut slopes should be observed during grading by an engineering geologist to determine if adverse conditions exist. Recommendations can be provided at that time, if necessary.

7.3 Future Project Plans

7.3.1 Prior to finalization of the grading plans for the property, a geotechnical investigation addressing the specific grading plans should be performed. The investigation should provide site specific grading recommendations, recommendations for mitigation of adverse soil conditions (i.e. compressible surficial soil deposits, landslides, slope stabilization, etc.) and preliminary foundation design criteria.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

SOURCE : 2000 THOMAS BROTHERS MAP
SAN DIEGO COUNTY, CALIFORNIA

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GCC / AML
DSK / D000D

VICINITY MAP

CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

DATE
PROJECT NO. 6517 - 32 - 01
FIG. 1

1VIC1

PROJECT NO. 06517-32-02

TRENCH T 1

ELEV. (MSL.) 260 DATE COMPLETED 2/23/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6				SC	**COMPACTED FILL** Loose to medium dense, moist, light to medium brown, Gravelly, Clayey SAND; with some silt -Sharp, benched contact			
8				CL	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very stiff to hard, moist, olive to brown, Silty CLAYSTONE -Weathered, fractured			
10					TRENCH TERMINATED AT 10 FEET			

Figure A-1, Log of Trench T 1

CRRE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 2

ELEV. (MSL.) 272 DATE COMPLETED 2/23/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
					ALLUVIUM Loose, damp, medium brown, very Sandy CLAY, with cobble, porous, roots, with charcoal specks			
2				SC				
4								
				GM	Loose to medium dense, moist, brown, Clayey, Sandy GRAVEL -Irregular erosional contact			
6								
				CL	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very stiff, moist, olive-gray, Silty CLAYSTONE; massive, weathered and fractured			
8								

TRENCH TERMINATED AT 8 FEET

Figure A-2, Log of Trench T 2

CRRE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
▧ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◣ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 3

ELEV. (MSL.) **290** DATE COMPLETED **2/23/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**TOPSOIL** Loose, damp, dark brown, Clayey, Gravelly fine SAND -Porous, with roots			
2					**TERRACE DEPOSIT** Stiff to medium dense, moist, reddish-brown, very Sandy CLAY to Clayey SAND; some scattered gravel, minor porosity			
4	T3-1 ☒							
6					-Increased density with depth, no pores			
8				SC	Medium dense, moist, dark yellow-brown, very Clayey SAND, with some silt, specks of charcoal			
10								
12				SM	Medium dense, moist, light reddish-brown to brown, Gravelly, Silty medium to coarse SAND; trace clay -More gravelly at base			
14					TRENCH TERMINATED AT 14 FEET			

Figure A-3, Log of Trench T 3

CRRE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	☒ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 4

ELEV. (MSL.) **350** DATE COMPLETED **2/23/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TOPSOIL** Soft, wet, reddish dark brown, Gravelly, Sandy CLAY			
2				GM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very dense, damp, light reddish-brown, Sandy, coarse CONGLOMERATE, with some clay -Irregular horizontal contact (+- 5 degrees)			
4 6				SM	Very dense, damp, light brown-tan, Silty, fine to medium SANDSTONE -Massive to approximately horizontal laminae			

TRENCH TERMINATED AT 7 FEET

Figure A-4, Log of Trench T 4

CRRE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 5

ELEV. (MSL.) 360 DATE COMPLETED 3/22/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				CL	**COLLUVIUM** Soft, wet, dense to medium, brown-red brown Gravelly, Sandy CLAY -Irregular transition			
4				CL	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very stiff, very moist, light olive, Silty CLAY (very weathered)			
6 8				CL	-Becomes hard, moist, medium olive-gray, Silty CLAYSTONE -Fractured, massive -Becomes harder			

TRENCH TERMINATED AT 8 FEET

Figure A-5, Log of Trench T 5

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

☒ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 6

ELEV. (MSL.) 335 DATE COMPLETED 3/22/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6				CL	**ALLUVIUM** Stiff, very moist, medium dark olive-brown (mottled) Sandy CLAY			
8 10				SC	**TERRACE DEPOSIT** Medium dense, moist, reddish brown-olive (mottled) very Clayey fine SAND, with scattered fine gravel			
12				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Dense, damp, light brown, Silty, fine to medium SANDSTONE; with scattered coarse gravel			
					TRENCH TERMINATED AT 13.5 FEET REFUSAL			

Figure A-6, Log of Trench T 6

CRRE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◪ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 7

ELEV. (MSL.) **310** DATE COMPLETED **3/22/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC-CL	**TOPSOIL** Loose, very moist, dark brown, Clayey SAND			
2 4				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Dense, damp, light brown to reddish-brown, Silty, fine to medium SANDSTONE -Massive, with scattered cobble			
6					TRENCH TERMINATED AT 6 FEET			

Figure A-7, Log of Trench T 7

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

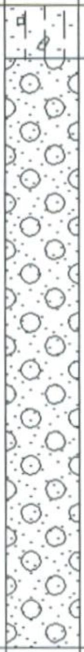
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 8

ELEV. (MSL.) 410 DATE COMPLETED 3/22/01

EQUIPMENT JD 555 TRACKHOE 24"



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM-GM	**TOPSOIL** Loose, moist, dark brown, Gravelly, Silty SAND			
2 4 6 8 10				GM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very dense, damp, light yellow-brown, Sandy coarse CONGLOMERATE (massive, horizontal imbricated) -Becomes more dense, some cementation			
12					TRENCH TERMINATED AT 12 FEET			

Figure A-8, Log of Trench T 8

CRRE

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 9

ELEV. (MSL.) **370** DATE COMPLETED **3/22/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	**TOPSOIL** Loose, moist, dark yellow-brown, very Clayey, Gravelly fine SAND			
2 4 6				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very dense, damp, light brown-tan, Silty, fine to medium SANDSTONE -Horizontal contact; no remolding			
8				CL	Hard, moist, medium olive-gray, Silty CLAYSTONE -Fractured, massive			

TRENCH TERMINATED AT 9 FEET

Figure A-9, Log of Trench T 9

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▨ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 10

ELEV. (MSL.) **360** DATE COMPLETED **3/2/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TOPSOIL** Soft, very moist, dark red-brown, very Sandy CLAY			
2 4 6				SM-ML	**STADIUM CONGLOMERATE/FRIARS FORMATION** Medium dense to dense, moist, light olive-brown, Silty to Clayey fine SANDSTONE to Sandy SILTSTONE -Massive, with thin laminae, irregular -Thin (1-2") hematite silt. clay-silt seam; horizontal -Near horizontal contact			
8					Dense to very dense, damp, light brown-tan, Silty, fine to medium SANDSTONE -Massive			
10					TRENCH TERMINATED AT 10 FEET			

Figure A-10, Log of Trench T 10

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
▧ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 11

ELEV. (MSL.) **330** DATE COMPLETED **3/2/01**

EQUIPMENT **JD 555 TRACKHOE 24"**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6		▨		SC	**ALLUVIUM** Loose, damp to moist, dark gray-brown to yellow-brown, Clayey, Gravelly fine SAND -Porous, with roots, root-voids, burrows			
8		▨		SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very dense, damp, light tan, Silty fine SANDSTONE; massive, chunky, near horizontal laminae			

TRENCH TERMINATED AT 9 FEET

Figure A-11, Log of Trench T 11

CRRE

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ☒ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 12

ELEV. (MSL.) 322 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				CL	**ALLUVIUM** Stiff, wet, dark brown, Sandy CLAY -Porous, with roots, burrows... -Irregular transition			
4 6 8				GM	Medium dense, reddish-brown, Sandy coarse GRAVEL -Mixed, disoriented cobbles -High angle contact inclined toward the north			
10				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Dense, damp, light red-brown to yellow-brown, Silty fine SANDSTONE -Massive, some clay			

TRENCH TERMINATED AT 11 FEET

Figure A-12, Log of Trench T 12

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

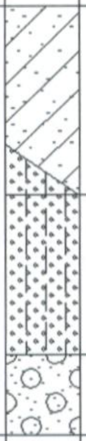
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 13

ELEV. (MSL.) **340** DATE COMPLETED **3/2/01**

EQUIPMENT **JD 555 TRACKHOE 24"**



DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				CL	**COLLUVIUM** Soft, wet, dark red-brown, Sandy CLAY			
4 6				GM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Dense, moist, light red-brown, Sandy coarse CONGLOMERATE -Horizontal bedding			
				GM	Very dense, damp to moist, light yellow-brown, Sandy, fine to medium CONGLOMERATE			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-13, Log of Trench T 13

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◪ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 14

ELEV. (MSL.) 370 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC-CL	**TOPSOIL** Loose, wet, dark brown, very Clayey fine SAND to Sandy CLAY			
2				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Very dense, damp, light yellow-brown to light tan (bands), Silty, very fine SANDSTONE -Becomes more sandy			
4								
6					-Approximately horizontal contact			
				GM	Very dense, damp, medium yellow-brown, Sandy coarse CONGLOMERATE -Imbricated gravel; massive			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-14, Log of Trench T 14

CRRE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
▨ ... DISTURBED OR BAG SAMPLE
◧ ... STANDARD PENETRATION TEST
◣ ... CHUNK SAMPLE
■ ... DRIVE SAMPLE (UNDISTURBED)
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06517-32-02

TRENCH T 15

ELEV. (MSL.) 330 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				CL	**TERRACE DEPOSIT** Soft, wet, dark red-brown, Sandy CLAY -Scattered gravel			
4 6				GC	Medium dense, very moist, brick red-brown, Clayey coarse GRAVEL, with some sand -Irregular EAST - sloping contact			
				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Dense, damp, light brown, Silty fine SANDSTONE			
8				GM	Very dense, damp, dark yellow-brown, Sandy coarse CONGLOMERATE -Horizontally imbricated			

TRENCH TERMINATED AT 9 FEET

Figure A-15, Log of Trench T 15

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◪ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. 06517-32-02

TRENCH T 16

ELEV. (MSL.) 330 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TOPSOIL** Soft, wet, dark yellow-brown, Sandy CLAY			
2 4				SC	**STADIUM CONGLOMERATE/FRIARS FORMATION** Medium dense, damp, light olive-brown, Clayey fine SANDSTONE -Very weathered and fractured			
6				SM	-Becomes more dense, less fractured and weathered Dense, damp, light olive-tan, Silty fine SANDSTONE -Massive, slightly weathered and fractured			
8					TRENCH TERMINATED AT 8 FEET			

Figure A-16, Log of Trench T 16

CRRE

SAMPLE SYMBOLS
☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. 06517-32-02

TRENCH T 17

ELEV. (MSL.) 300 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				CL	**COLLUVIUM** Soft, very moist, dark brown, Sandy CLAY			
4 6				SM	**STADIUM CONGLOMERATE/FRIARS FORMATION** Medium dense to dense, moist, light olive-brown, Silty fine SANDSTONE, some clay -Becomes more dense, less weathered			
					TRENCH TERMINATED AT 7 FEET			

Figure A-17, Log of Trench T 17

CRRE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. 06517-32-02

TRENCH T 18

ELEV. (MSL.) 264 DATE COMPLETED 3/2/01

EQUIPMENT JD 555 TRACKHOE 24"

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2		▨		CL	**ALLUVIUM** Soft, wet, dark yellow-brown, Sandy CLAY			
4 6		▨		CL	**STADIUM CONGLOMERATE/FRIARS FORMATION** Hard, moist, medium gray-olive, Silty CLAYSTONE -Massive, fractured			
					TRENCH TERMINATED AT 7 FEET			

Figure A-18, Log of Trench T 18

CRRE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX A

APPENDIX A

RECOMMENDED GRADING SPECIFICATIONS

FOR

CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

PROJECT NO: 06527-32-02

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1. These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2. Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. It will be necessary that the Consultant provide adequate testing and observation services so that he may determine that, in his opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep him apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3. It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, and so forth, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that construction be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1. **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2. **Contractor** shall refer to the Contractor performing the site grading work.

2.3. **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4. **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5. **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6. **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7. **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1. Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1. **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than 3/4 inch in size.

3.1.2. **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3. **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than 3/4 inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2. Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3. Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4. The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized, provided it is acceptable to the governing agency, Owner and Consultant.

3.5. Representative samples of soil materials to be used for fill shall be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6. During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

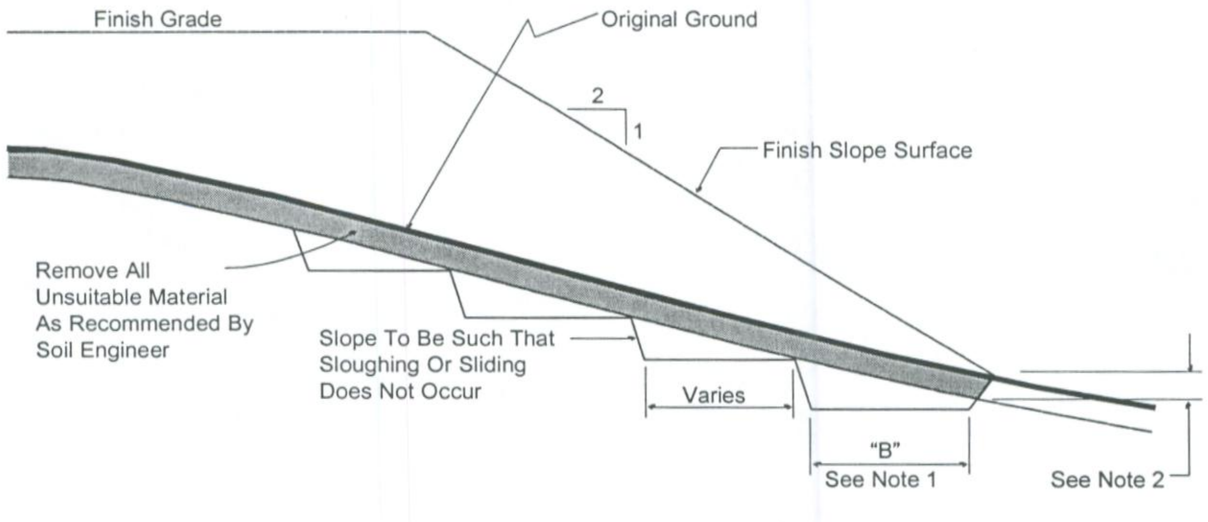
4.1. Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2 inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments which are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3. After clearing and grubbing of organic matter or other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction shall be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4. Where the slope ratio of the original ground is steeper than 6:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES:

(1) Key width "B" should be a minimum of 10 feet wide, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the bottom key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5. After areas to receive fill have been cleared, plowed or scarified, the surface should be disced or bladed by the Contractor until it is uniform and free from large clods. The area should then be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6.0 of these specifications.

5. COMPACTION EQUIPMENT

5.1. Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2. Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1. *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1. *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2. In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D1557-91.

6.1.3. When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4. When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5. After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D1557-91. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6. Soils having an Expansion Index of greater than 50 may be used in fills if placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7. Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8. As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2. *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1. Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2. Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3. For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4. For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5. Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6. All rock placement, fill placement and flooding of approved granular soil in the windrows must be continuously observed by the Consultant or his representative.

6.3. *Rock* fills, as defined in Section 3.1.3., shall be placed by the Contractor in accordance with the following recommendations:

6.3.1. The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent, maximum slope of 5 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2. *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made will be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3. Plate bearing tests, in accordance with ASTM D1196-64, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the number of passes of the compaction equipment to be performed. If performed, a minimum of three plate bearing tests shall be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4. A representative of the Consultant shall be present during *rock* fill operations to verify that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading. In general, at least one test should be performed for each approximately 5,000 to 10,000 cubic yards of *rock* fill placed.

6.3.5. Test pits shall be excavated by the Contractor so that the Consultant can state that, in his opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

6.3.6. To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

6.3.7. All *rock* fill placement shall be continuously observed during placement by representatives of the Consultant.

7. OBSERVATION AND TESTING

7.1. The Consultant shall be the Owners representative to observe and perform tests during clearing, grubbing, filling and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill shall be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test shall be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2. The Consultant shall perform random field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion as to whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

7.3. During placement of *rock* fill, the Consultant shall verify that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant shall request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. If performed, plate bearing tests will be performed randomly on the surface of the most-recently placed lift. Plate bearing tests will be performed to provide a basis for expressing an opinion as to whether the *rock* fill is adequately seated. The maximum deflection in the *rock* fill determined in Section 6.3.3 shall be less than the maximum deflection of the properly compacted *soil* fill. When any of the above criteria indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

7.4. A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

7.5. The Consultant shall observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6. Testing procedures shall conform to the following Standards as appropriate:

7.6.1. Soil and Soil-Rock Fills:

7.6.1.1. Field Density Test, ASTM D1556-82, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2. Field Density Test, Nuclear Method, ASTM D2922-81, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3. Laboratory Compaction Test, ASTM D1557-91, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test, Uniform Building Code Standard 29-2, *Expansion Index Test.*

7.6.2. Rock Fills

7.6.2.1. Field Plate Bearing Test, ASTM D1196-64 (Reapproved 1977) *Standard Method for Nonrepresentative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1. During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

8.2. After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

9.1. Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

9.2. The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *City of San Diego, Seismic Safety Study, Geologic Hazards And Faults,* sheet 43, Development Services Department, 1995 edition.

2. *Landslide Hazards in the Northern Part of The San Diego Metropolitan Area, San Diego County, California* Delmar Quadrangle, California Divisions of Mines and Geology, Open File Report 95-04, 1995.

3. *Preliminary Fault Activity Map of California,* California Division of Mines And Geology, Open File report 92-03, 1992, and revised map dated 1994.

4. *Geology of The San Diego Metropolitan Area, California,* California Division of Mines And Geology, Bulletin 200 (1975).

5. *Soil and Geologic Reconnaissance for the Shaw Subdivision San Diego, California,* Geocon Incorporated, July 5, 1990.

6. *Soil and Geologic Investigations for Fairbanks Highlands, San Diego, California,* Geocon Incorporated, September 21, 1989.

7. *Soil and Geologic Reconnaissance for Black Mountain Ranch, San Diego, California,* Geocon Incorporated, October 16, 1989, rev. May 9, 1991.

8. *Geotechnical Investigation for Scarcia-Reed Property, San Diego, California,* Geocon Incorporated, November 13, 1998.

9. *Soil and Geologic Reconnaissance for Future Urbanizing Area—Subarea IV Property, San Diego, California,* prepared by Geocon, Incorporated, dated May 10, 1993.

10. *The Rose Canyon Fault Zone Southern California,* California Division of Mines And Geology, Open file report, 93-01, 1993.

11. *Probabilistic Seismic Hazard Assessment for the State of California,* California Division of Mines And Geology, Open file report 96-08, uses Open-File Report 96-706, 1996.

12. Aerial photographs, United States Department of Agriculture, AXN-3M-181 and AXN-3M-182, 1953.

13. Allen, C. R., *et al., Relationship Between Seismicity and Geologic Structure in the Southern California Region,* Seismic Society of America, Bulletin V.55, No. 4.

14. *Geotechnical Investigation for Rhodes Property, San Diego, California,* Geocon Incorporated, July 2, 1998.

3.16.01

C. RUIZ RDWY EXT.

GEOCON LEGEND

- **Qcf** ....COMPACTED FILL
- **Qudf** ........UNDOCUMENTED FILL
- **Qls** ....POSSIBLE LANDSLIDE DEBRIS
- **Qal** ....ALLUVIUM
- **Qc** ....COLLUVIUM
- **Qt** ....TERRACE DEPOSITS
- **Qln** ....LINDAVISTA FORMATION
- **Tst/Tf** ....STADIUM CONGLOMERATE / FRIARS FORMATION (Undifferentiated)
- ....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- T-18 ....APPROX. LOCATION OF EXPLORATORY TRENCH
- ....SPRING, SEEPS, SURFACE WATER

Latitude 33
Planning and Engineering
4180 La Jolla Village Dr., Suite 330
La Jolla, CA 92037
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GEOLOGIC MAP
CAMINO RUIZ ROADWAY EXTENSION
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121-2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 100'
DATE 03-16-2001
PROJECT NO. 06517 - 32 - 02
FIGURE 2
SHEET 1 OF 1

ADDENDUM
GEOTECHNICAL CONSULTATION

CAMINO DEL SUR
SAN DIEGO, CALIFORNIA

PREPARED FOR

LATITUDE 33
SAN DIEGO, CALIFORNIA

APRIL 15, 2003

Project No. 06517-32-02
April 15, 2003

Latitude 33
Planning and Engineering
4933 Paramount Drive, Second Floor
San Diego, California 92123

Attention: Mr. Ted Shaw

Subject: CAMINO DEL SUR
SAN DIEGO, CALIFORNIA
ADDENDUM GEOTECHNICAL CONSULTATION

Gentlemen:

In accordance with your authorization, we have prepared this addendum report to address review comments by the City of San Diego, LDR-Geology department. For the purpose of this correspondence, we have reviewed the city comments dated September 12, 2002, and our reports entitled *Soil And Geologic Reconnaissance, Camino Ruiz Roadway Extension, San Diego, California*, dated July 7, 2000, *Supplemental Soil and Geologic Reconnaissance, Camino Ruiz Roadway Extension, San Diego, California*, dated March 16, 2001, and *Geotechnical Investigation, Rhodes Property, San Diego, California,* dated July 2, 1998. We have also reviewed the roadway alignment plan provided by Latitude 33 Planning and Engineering which is Figure 1 of this report.

The following information presents the city review comment and our response:

Comment (Item 3): The geologic map presented in the referenced report dated 3/16/01 should be revised. Geologic mapping should be extended to the proposed intersection of Camino Ruiz and Carmel Mountain Road. The location of subsurface exploration conducted by the geotechnical consultant on and adjacent to the proposed alignment should be added to the map. Add a north arrow and graphic scale to the map. Any Additional subsurface exploration that may be conducted in response to this review must be added to the geologic map.

Response: Figure 1 (Map Pocket) presents the requested information on the new base map for the alignment. Logs of subsurface excavations from the adjacent property which were not included in the previous reconnaissance reports are presented in Appendix A.

Comment (Item 4): Provide geologic cross sections that illustrate the proposed major cut slopes below existing homes. The location of property lines, existing grades, proposed grades, and distribution of geologic materials should be depicted on the cross sections.

Response: See Figures 2 through 4 (Cross Sections A-A', B-B' and C-C' on Figure 1).

Comment (Item 5): An in-depth investigation appears to be warranted that addresses the location and continuity of the claystone interbeds or lenses in the area of major cut slopes. If adverse geologic conditions are indicated, quantitative slope stability analysis will be required.

Response: Geocon Incorporated concurs with the reviewer's comment. The possible discontinuities between stratigraphic units in the area has been documented on several nearby projects. As suggested by Trench Nos. T5 and T6 (March 16, 2001 report) these features may pinch in and out due to the transitional nature (interfingering) of the geologic strata. If discontinuous, the siltstone/claystone lenses do not typically result in gross slope instability.

Since the referenced July 7, 2000 and March 16, 2001 reports are preliminary in nature, further investigation of major cut slope areas is recommended to verify that the minimum safety standards are achieved and to present comprehensive geotechnical design information. A geotechnical investigation is recommended once the project proceeds through the Environmental Impact Report phase. In the event that geologic features are encountered during future studies that result in a safety factor below the required minimum, slope buttressing would be recommended.

Comment (Item 6): The consultant should conduct sufficient investigation to support a statement that remedial grading beyond the proposed grading will or will not be necessary based on their evaluation.

Response: This concern was the reason for the March 16, 2001 investigation. Please see pages 1 and 7 of this report. In the event that slope buttressing is necessary along the western margin of the alignment, the remedial grading should be accomplished within the project limits.

Should you have questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

DBE

David B. Evans
CEG 1860

DBE:dmc

(6/del) Addressee

PROJECT NO. 06021-52-01

BORING B 3

ELEV. (MSL.) 412 DATE COMPLETED 12/19/97

EQUIPMENT E-120 BUCKET AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1 ▨			SM	**TOPSOIL** Loose, moist, dark brown, Silty, fine to medium SAND with trace of clay			
2					**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown to light grey, Silty, fine to medium SANDSTONE with trace of clay; gravel/cobble zones, massive with clay infilled fractures			
4								
6	B3-2 ■			SM		5	112.4	12.5
8								
10	B3-3 ■					7	124.3	11.8
12	B3-4 ▨							
14					-Becomes light grey and micaceous at 13 feet			
16	B3-5 ■					3	113.5	11.7
18					-Several thin claystone lenses from 17 to 18 feet			
20	B3-6 ■					7	116.8	14.7

BORING TERMINATED AT 21 FEET

Figure A-4 **Log of Boring B 3, page 1 of 1**

RHODE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 4

ELEV. (MSL.) **418** DATE COMPLETED **12/19/97**

EQUIPMENT **E-120 BUCKET AUGER**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC/CL	**TOPSOIL** Soft to stiff, moist, orange-brown, Clayey fine SAND/fine Sandy CLAY with gravel/cobble			
2				GC	**LINDAVISTA FORMATION** Dense, moist, light brown to orange-brown, Clayey, fine to very coarse Sandy GRAVEL with some cobble			
4								
6				SC/SM	-Decrease in clay and gravel/cobble content at 6 feet			
8	B4-1 ▨			SM	-Sharp near horizontal contact at 7.5 feet **STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown, Silty fine SANDSTONE;micaceous			
10	B4-2 ■ B4-3 ▨				-Sharp horizontal contact at 10.2 feet	6	109.8	16.5
12				CL/ML	Hard, damp, greyish-green, Silty CLAYSTONE/Clayey SILTSTONE;micaceous			
14								
16	B4-4 ■			SM	-Gradational contact at 15 feet Dense, damp, light grey, Silty fine SANDSTONE; massive	6/10"	123.8	12.2
18								
20	B4-5 ■					4/5"	106.9	9.8
22								
24								
26	B4-6 ■					5/6"	112.1	8.4

BORING TERMINATED AT 26 FEET

Figure A-5 **Log of Boring B 4, page 1 of 1**

RHODE

SAMPLE SYMBOLS			
SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

BORING B 5

ELEV. (MSL.) **420** DATE COMPLETED **12/19/97**

EQUIPMENT **E-120 BUCKET AUGER**

DEPTH IN FEET	SAMPLE NO.		LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					SM/SC	**TOPSOIL** Loose, moist, dark brown, Silty/Clayey, fine to coarse SAND with gravel/cobble			
2 4 6	B5-1	■			SM/GM	**LINDAVISTA FORMATION** Dense, damp to moist, light brown to orange brown, Silty, fine to very coarse SAND with abundant GRAVEL/COBBLE; trace of clay -Becomes very dense with a decrease in gravel content at 4 feet -Sharp near horizontal contact	5/8"	113.6	12.9
8 10	B5-2 B5-3	■ ▨			SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light brown, Silty fine SANDSTONE; micaceous	5/8"	114.9	7.0
12 14					GM	Dense, damp, light brown, Silty, fine to medium Sandy GRAVEL/COBBLE CONGLOMERATE; matrix supported			

BORING TERMINATED AT 15 FEET

Figure A-6 **Log of Boring B 5, page 1 of 1**

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

◧ ... STANDARD PENETRATION TEST

■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE

◪ ... CHUNK SAMPLE

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 11

ELEV. (MSL.) 375 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				SM/SC	**UNDOCUMENTED FILL** Loose, moist, orange-brown, Silty/Clayey, fine to medium SAND with abundant cobble; visible lifts, roots at lift boundaries			
4				SM	Loose, dry to damp, light brown to grey, Silty fine SAND with trace of clay; occasional gravel/cobble, abundant rootlets			
6				SC	Soft, very moist, dark brown, Clayey, fine to medium SAND			
8				SM	Loose, damp, brown, Silty, fine to medium SAND			
10				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp to moist, light gray with orange staining, Silty, fine to medium SANDSTONE			
					TRENCH TERMINATED AT 11 FEET			

Figure A-17, Log of Trench T 11

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
☒ ... DISTURBED OR BAG SAMPLE
◩ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 12

ELEV. (MSL.) **392** DATE COMPLETED **12/29/97**

EQUIPMENT **JD 555 BACKHOE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2 4 6			▼	SM/GM	**UNDOCUMENTED FILL** Loose, moist, dark brown, Silty fine SAND with some gravel/cobble; abundant rootlets, root pockets at lift boundaries, visible lifts -Increase in gravel/cobble at 3 feet with some clayey zones -Moderate seepage at 6 feet -One-foot-thick clay lens at 6 feet			
8				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, moist, orange-brown, Silty, fine to medium SANDSTONE			

TRENCH TERMINATED AT 8 FEET

Figure A-18, Log of Trench T 12

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

▨ ... DISTURBED OR BAG SAMPLE

◧ ... STANDARD PENETRATION TEST

◪ ... CHUNK SAMPLE

■ ... DRIVE SAMPLE (UNDISTURBED)

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 13

ELEV. (MSL.) **374** DATE COMPLETED **12/29/97**

EQUIPMENT **JD 555 BACKHOE**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 2				GM	**ALLUVIUM** Loose, damp, brown, Silty, fine to medium Sandy GRAVEL/COBBLE -One-foot-thick Sandy CLAY lens at 2 feet			
4				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange staining, Silty fine SANDSTONE with some cobble			
					TRENCH TERMINATED AT 5 FEET			

Figure A-19, Log of Trench T 13

RHODE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 14

ELEV. (MSL.) 341 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				GM	**ALLUVIUM** Loose, damp, brown, Silty, fine to medium Sandy GRAVEL/COBBLE -One-foot-thick sandy clay lens at 2 feet			
2				SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange staining, Silty fine SANDSTONE			
4					TRENCH TERMINATED AT 4 FEET			

Figure A-20, Log of Trench T 14

RHODE

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 06021-52-01

TRENCH T 15

ELEV. (MSL.) 350 DATE COMPLETED 12/29/97

EQUIPMENT JD 555 BACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		▨		CL	**TOPSOIL** Stiff, moist, brown, fine Sandy CLAY			
2		░		SM	**STADIUM CONGLOMERATE/MISSION VALLEY FORMATION** Dense, damp, light gray with orange stain, Silty fine SANDSTONE			
					TRENCH TERMINATED AT 3 FEET			

Figure A-21, Log of Trench T 15

RHODE

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL

◧ ... STANDARD PENETRATION TEST

■ ... DRIVE SAMPLE (UNDISTURBED)

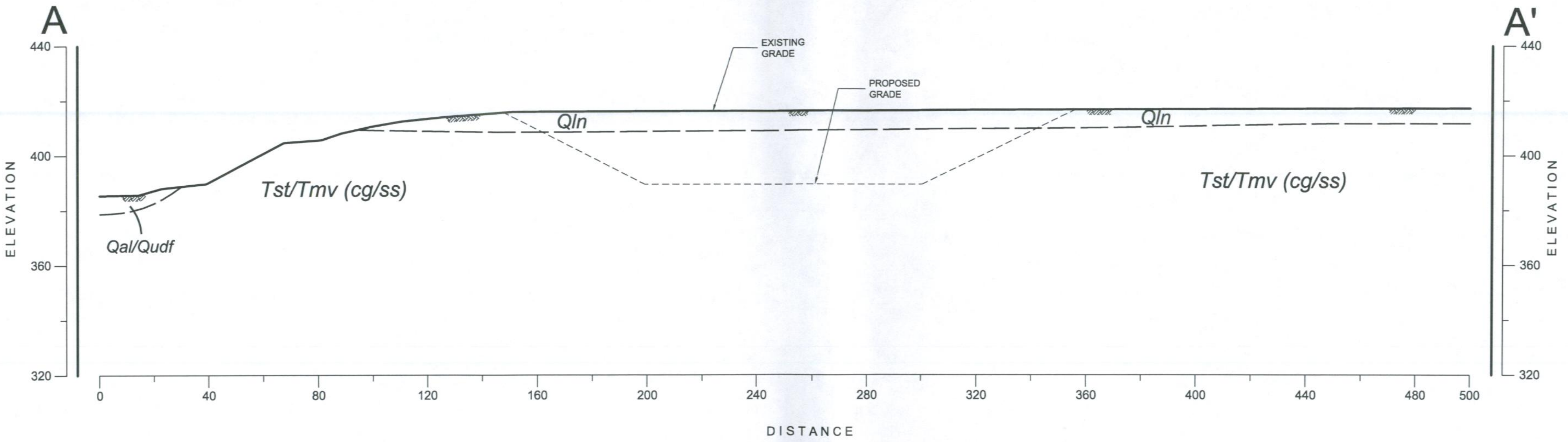
⊠ ... DISTURBED OR BAG SAMPLE

◣ ... CHUNK SAMPLE

▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CAMINO DEL SUR
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON
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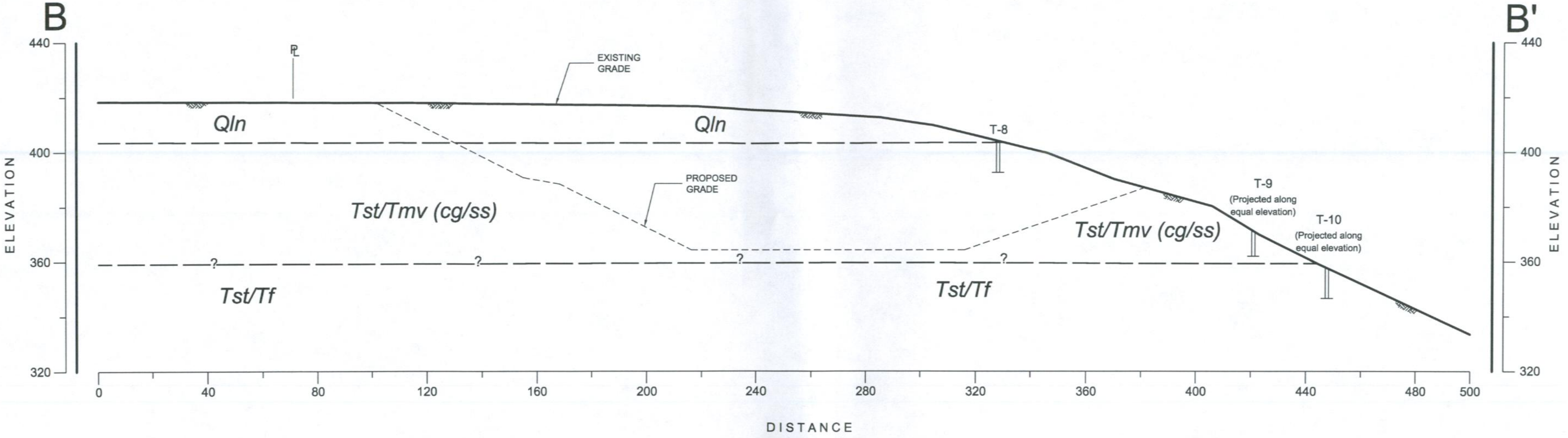
PROJECT NO. 06517 - 32 - 02
FIGURE 2
DATE 04 - 15 - 2003

E:/2003/6517_YW1.DWG/aml

CAMINO DEL SUR
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION B-B′

SCALE: 1" = 40' (Vert. = Horiz.)

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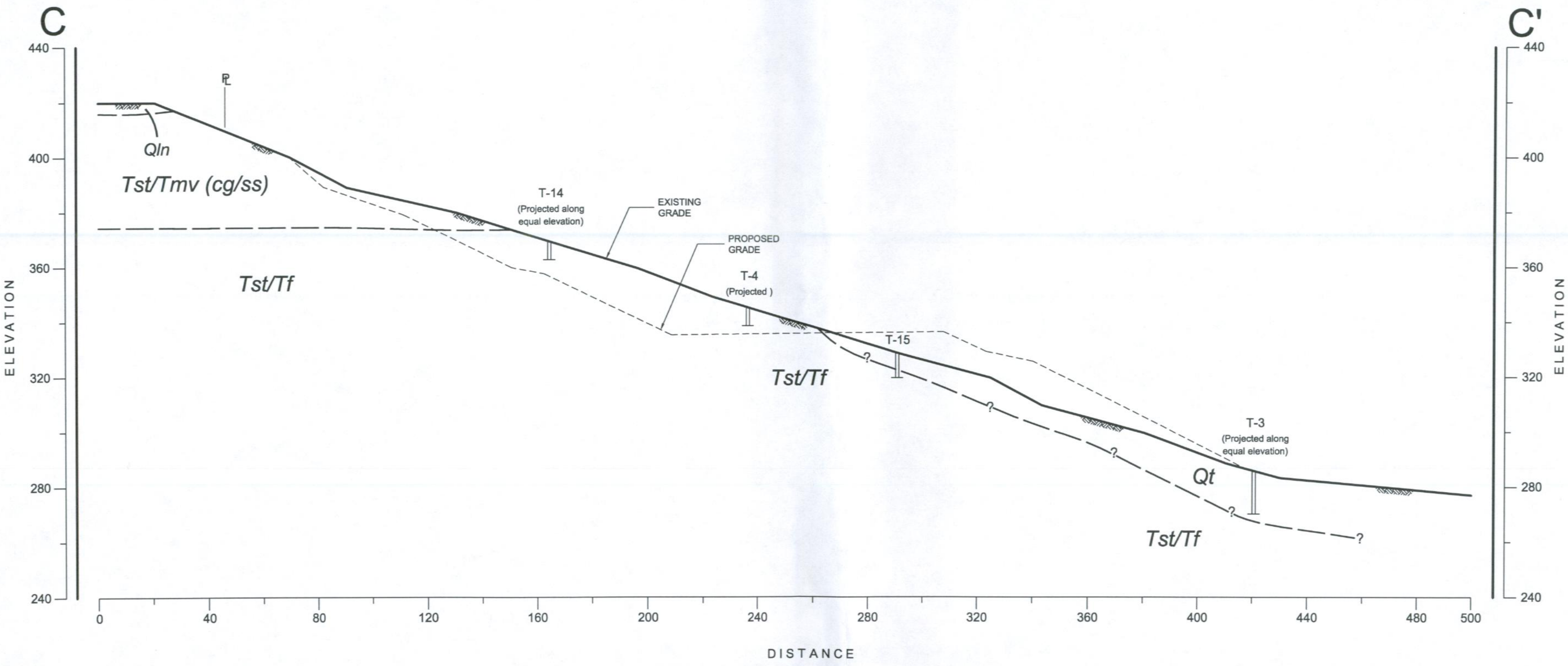
PROJECT NO. 06517 - 32 - 02
FIGURE 3
DATE 04 - 15 - 2003

E:/2003/6517_YW2.DWG/aml

CAMINO DEL SUR
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 40' (Vert. = Horiz.)

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6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
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PROJECT NO. 06517 - 32 - 02
FIGURE 4
DATE 04 - 15 - 2003

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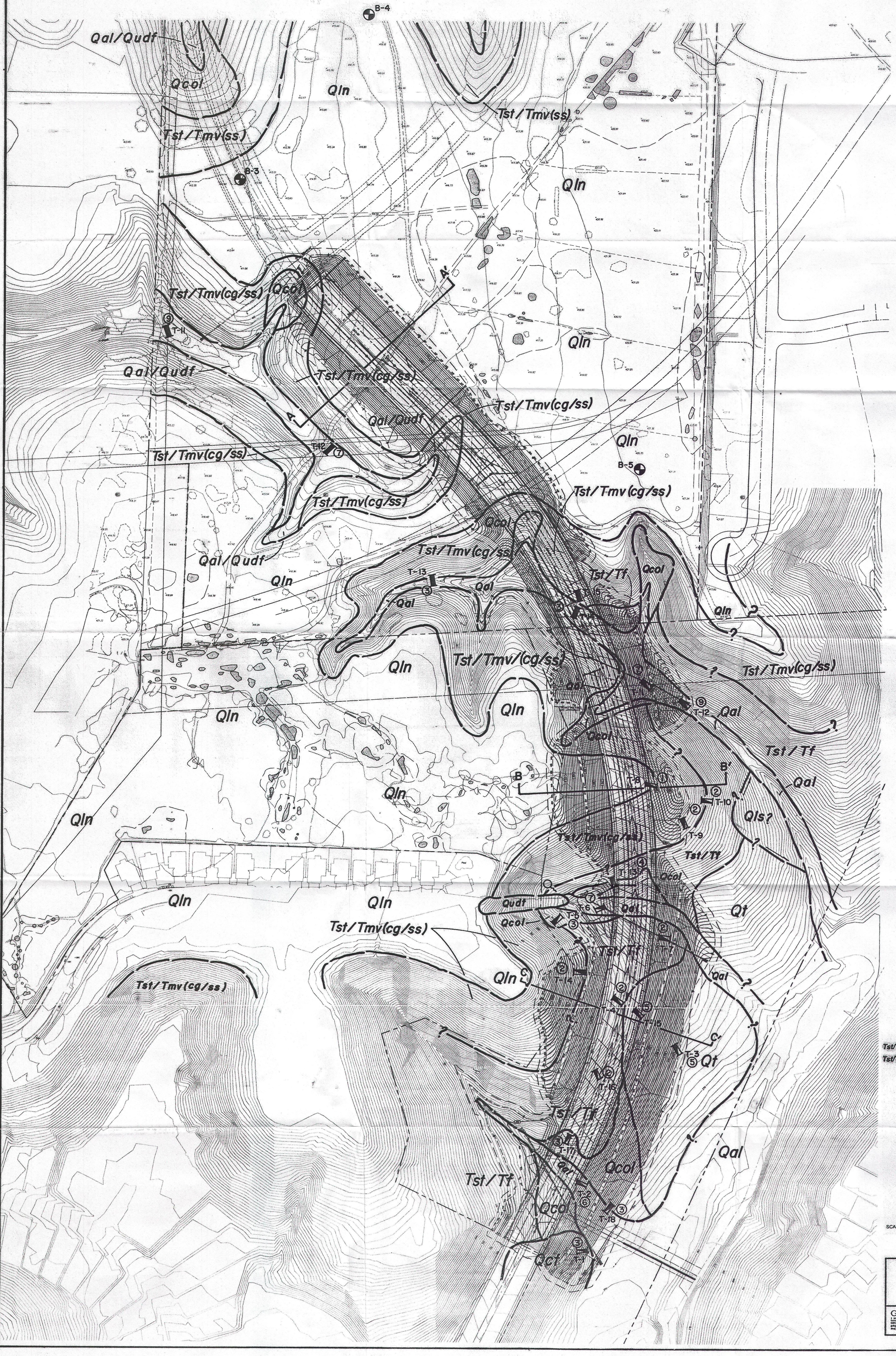


GEOCON LEGEND

Qcf	COMPACTED FILL PLACED DURING GRADING OF EXISTING CAMINO RUIZ
Qudf	UNDOCUMENTED FILL
Qls	POSSIBLE LAND SLIDE DEPOSIT
Qcol	COLLUVIUM
Qal	ALLUVIUM
Qt	TERRACE DEPOSIT
Qln	LINDAVISTA FORMATION
Tst/Tmv(ss)	STADIUM CONGLOMERATE / MISSION VALLEY FORMATION SANDSTONE FACIES
Tst/Tmv(cg)	STADIUM CONGLOMERATE / MISSION VALLEY FORMATION CONGLOMERATE FACIES
Tst/tf	STADIUM CONGLOMERATE / FRIARS FORMATION
⁀ ? ⋯	APPROXIMATE GEOLOGIC CONTACT (Dotted Where buried) (queried Where Estimated)
B 5 ⊕	APPROXIMATE LOCATION OF EXPLORATORY BORING (JULY 2, 1998 Report)
T-15 ▬	APPROXIMATE LOCATION OF EXPLORATORY TRENCH (JULY 2, 1998 Report)
T-18 ▭	APPROXIMATE LOCATION OF EXPLORATORY TRENCH (MARCH 16, 2001 Report)
⑨	APPROXIMATE THICKNESS OF SURFICIAL DEPOSIT REQUIRING REMEDIAL GRADING (Feet)
♀	SEEP/ SURFACE WATER
A ⌴ A'	GEOLOGIC CROSS SECTION

N

SCALE : 1" = 100'

GEOLOGIC MAP

CAMINO DEL SUR
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" =100'
DATE 04-15-2003
PROJECT NO. 06517 - 32 - 02
SHEET 1 OF 1
FIGURE 1

UPDATE
LETTER AND RESPONSE TO GEOTECHNICAL REVIEW COMMENTS

MERGE 56
(FORMERLY RHODES CROSSING)
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

LATITUDE 33
SAN DIEGO, CALIFORNIA

AUGUST 29, 2014
PROJECT NO. 06021-32-04

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 06021-32-04
August 29, 2014

Latitude 33
9968 Hibert Street
San Diego, California 92131

Attention: Mr. Jim Kilgore

Subject: UPDATE LETTER AND RESPONSE TO GEOTECHNICAL REVIEW COMMENTS
MERGE 56 (FORMERLY RHODES CROSSING)
SAN DIEGO, CALIFORNIA

References:

1. *Geotechnical Investigation, Rhodes Property, San Diego, California*, dated July 2, 1998 (Project No. 06021-32-01).
2. *Merge 56, (Formerly Rhodes Crossing), Planned Development Permit (PDP No. 53203), Site Development Permit (SDP No. 53204, No. 40-0386, No. 3278), Conditional Use Permit (CUP No. ______), Vesting Tentative Map (No. 7938), Camino Del Sur and Carmel Mountain Road, San Diego, California*, prepared by Latitude 33, Sheets 1 through 35, revision date September 9, 2014.

Dear Mr. Kilgore:

This correspondence has been prepared to respond to the comments contained in the April 18, 2014, *Cycle Issues* prepared by Mr. Jim Quinn from the City of San Diego, LDR-Geology department. Each issue along with our response is presented below. In addition, we intend to prepare an update geotechnical report that includes supplemental subsurface information along with laboratory and engineering analysis in those areas where information is limited.

Issue 2: *Submit an original quality, full-size copy of the geologic map attached to the geotechnical report dated July 2, ~~2014~~ 1998.*

Response: A full-size copy of this map has been included in the map pocket.

Issue 3: *Submit an addendum geotechnical report or update letter that specifically addresses the current site conditions and proposed development, and addresses or provides the following:*

Response: This correspondence serves as the update letter and the following responses address the reviewers' comments. An update geotechnical report including additional subsurface information will be performed at a later date.

Issue 4: *Provide a geologic/geotechnical map on a topographic base that shows the proposed conceptual grading and distribution of fill and geologic units. Show the anticipated limits of remedial grading on the geologic/geotechnical map.*

Response: We have prepared an updated *Geologic Map, (*Figure 1, map pocket) showing the proposed grading and approximate extent of the geologic units, excluding topsoil. Also shown in green is the maximum limit of anticipated potential remedial grading, which is confined to areas within the project boundary.

Issue 5: *Provide representative cross sections that show existing grades, proposed grades, and limits of recommended remedial grading. Show the distribution of fill, geologic units, and ground water conditions on the cross sections.*

Response: We have prepared four cross sections entitled *Geologic Cross Sections A-A' through D-D'* (Figures 3 and 4, map pocket) that depict our interpretation of the underlying geologic conditions in select areas.

Issue 6: *The project's geotechnical consultant should consider reviewing the Geologic Map of the 30'x60' Quadrangle, California by Kennedy and Tan (2008) and revising their geotechnical report as deemed necessary.*

Response: We have reviewed the 2008 geologic map, Figure 1, and have modified the previously noted Lindavista Formation (Qln) to Very Old Paralic Deposits (Qvop8) on Figure 1.

Issue 7: *If permanent storm water BMP's are proposed that involve active or passive infiltration or percolation, the project's geotechnical consultant must provide input in accordance with Appendix F of the City's "Guidelines for Geotechnical Reports".*

Response: Three basins are proposed for this project. One southeast of the intersection of State Route 56 and Camino Del Sur and two along the west side of Camino Del Sur to the south. It is understood all three basins will be lined, therefore, active or passive infiltration is not a consideration for this project.

Issue 8: *Confirm that the existing and proposed slopes in the area of the proposed development will have a factor of safety of 1.5 or greater with respect to gross and surficial slope stability following project completion.*

Response: Provided the recommendations presented in Reference No. 1, and subsequent updates, are implemented during design and construction, the slopes on site will possess a factor of safety of at least 1.5 for both gross and surficial stability following project completion.

Issue 9: *The project's geotechnical consultant must address if any geological/geotechnical factor are present that could require a redesign of the Vesting Tentative Map or alignment of future public streets.*

Response: Based on a review of the referenced report and plans, it is our opinion that there are no significant geologic and or geotechnical factors that would require modification to the VTM or alignment of proposed public roadways.

Issue 10: *The consultant should provide a conclusion regarding whether or not the site is suitable for the intended use.*

Response: No soil or geologic conditions were encountered that, in the opinion of Geocon Incorporated, would preclude the development of the site as proposed, provided the recommendations of the referenced report are followed. Therefore, the site is suitable for its intended use.

If there are any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Troy K. Reist

Troy K. Reist
CEG 2408

PROFESSIONAL GEOLOGIST
TROY K. REIST
No. 2408
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

David B. Evans
CEG 1860

PROFESSIONAL GEOLOGIST
DAVID B.
EVANS
No. 1860
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

TKR:DBE:dmc

(6) Addressee

GEOCON LEGEND

Qpf ....PREVIOUSLY PLACED FILL
Qudf ........UNDOCUMENTED FILL
Qal ....ALLUVIUM
Qcol ....COLLUVIUM
Qls ....SHALLOW LANDSLIDE DEPOSIT
Qt ....TERRACE DEPOSIT
Qvop8 ....VERY OLD PARALIC DEPOSITS
Tst/Tmv (ss) ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-SANDSTONE FACIES
Tst/Tmv (cg) ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-CONGLOMERATE FACIES
Tst/Tf ....STADIUM CONGLOMERATE / FRIARS FORMATION
?...... ....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried; Queried Where Uncertain)
B-5 ⊕ ....APPROX. LOCATION OF PREVIOUS EXPLORATORY BORING
T-17 ....APPROX. LOCATION OF PREVIOUS EXPLORATORY TRENCH (1998 Report)
T-15 ....APPROX. LOCATION OF PREVIOUS EXPLORATORY TRENCH (2001 Report)
⑬ ....APPROX. THICKNESS OF SURFICIAL DEPOSIT REQUIRING REMEDIAL GRADING (Feet)
........APPROX. LOCATION OF ANTICIPATED SUBDRAIN
........SPRINGS, SEEPS, SURFACE WATER
LB-3 ◉ ....APPROX. LOCATION OF PROPOSED LARGE DIAMETER BORING
T-25 ....APPROX. LOCATION OF PROPOSED TRENCH
🟩 ....MAXIMUM LIMITS OF POTENTIAL REMEDIAL GRADING

GEOLOGIC MAP

MERGE 56
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 60'	DATE 08 - 29 - 2014		FIGURE 1
PROJECT NO. 06021 - 32 - 04			
SHEET 1 OF 2			

Plotted:08/28/2014 9:00AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06021-32-04 MERGE 56\SHEETS\06021-32-04 GeoMap.dwg

SEE FIGURE 2

GEOCON LEGEND

- **Qpf** ....PREVIOUSLY PLACED FILL
- **Qudf** ........UNDOCUMENTED FILL
- **Qal** ....ALLUVIUM
- **Qcol** ....COLLUVIUM
- **Qls** ....SHALLOW LANDSLIDE DEPOSIT
- **Qt** ....TERRACE DEPOSIT
- **Qvop8** ....VERY OLD PARALIC DEPOSITS
- **Tst/Tmv (ss)** ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-SANDSTONE FACIES
- **Tst/Tmv (cg)** ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-CONGLOMERATE FACIES
- **Tst/Tf** ....STADIUM CONGLOMERATE / FRIARS FORMATION
- ?...... ....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried; Queried Where Uncertain)
- B-5 ....APPROX. LOCATION OF PREVIOUS EXPLORATORY BORING
- T-17 ....APPROX. LOCATION OF PREVIOUS EXPLORATORY TRENCH (1998 Report)
- T-15 ....APPROX. LOCATION OF PREVIOUS EXPLORATORY TRENCH (2001 Report)
- ⑬ ....APPROX. THICKNESS OF SURFICIAL DEPOSIT REQUIRING REMEDIAL GRADING (Feet)
- ....APPROX. LOCATION OF ANTICIPATED SUBDRAIN
- ....SPRINGS, SEEPS, SURFACE WATER
- LB-3 ....APPROX. LOCATION OF PROPOSED LARGE DIAMETER BORING
- T-25 ....APPROX. LOCATION OF PROPOSED TRENCH
- 🟩 ....MAXIMUM LIMITS OF POTENTIAL REMEDIAL GRADING

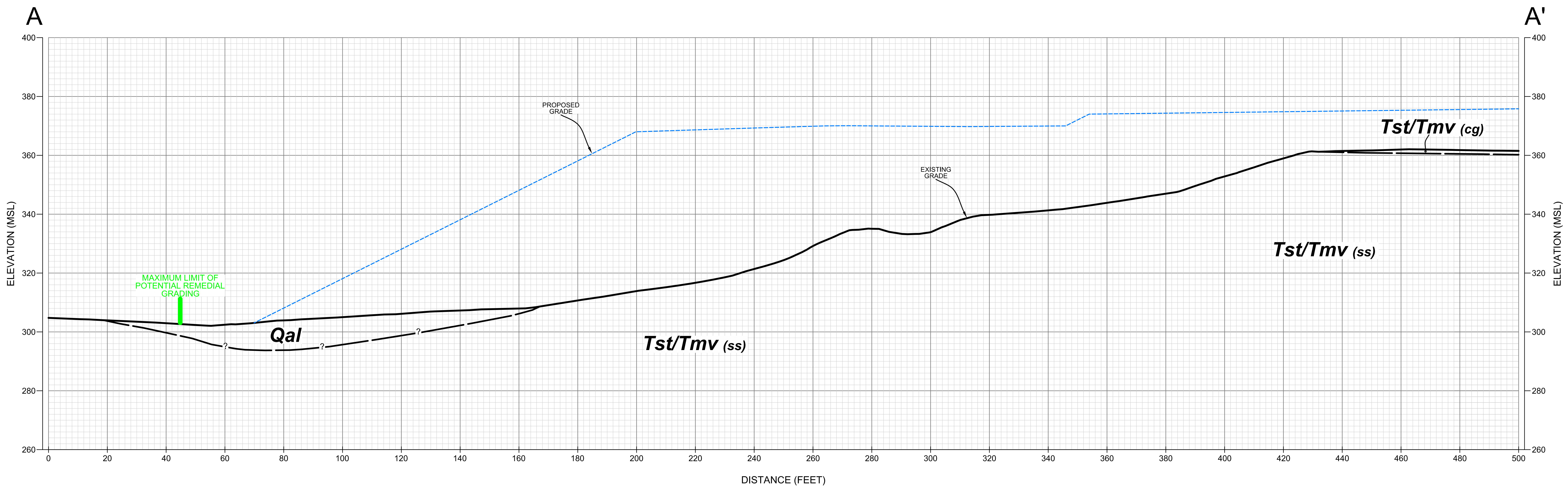
GEOLOGIC MAP

MERGE 56
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

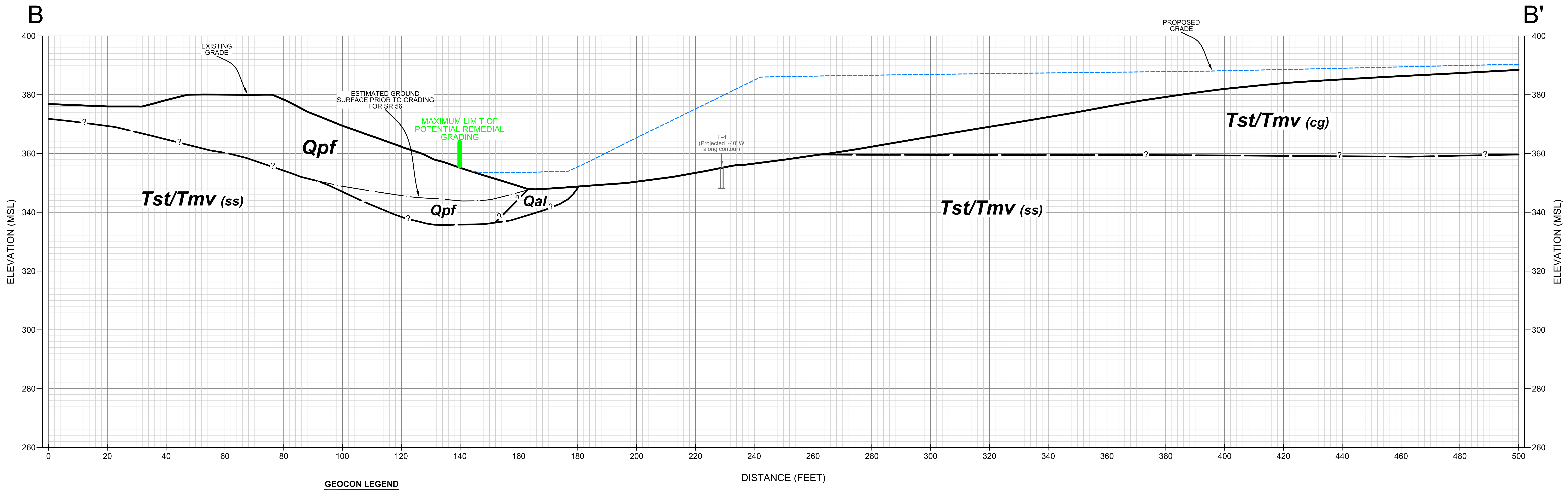
SCALE 1" = 60'
DATE 08 - 29 - 2014
PROJECT NO. 06021 - 32 - 04
FIGURE 2
SHEET 2 OF 2

Plotted:08/28/2014 9:01AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06021-32-04 MERGE 56\SHEETS\06021-32-04 GeoMap.dwg



GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

Qpf	........PREVIOUSLY PLACED FILL
Qal	........ALLUVIUM
Qvop8	........VERY OLD PARALIC DEPOSITS
Tst/Tmv (ss)	........STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-SANDSTONE FACIES
Tst/Tmv (cg)	........STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-CONGLOMERATE FACIES
Tst/Tf	........STADIUM CONGLOMERATE / FRIARS FORMATION
T-4	........APPROX. LOCATION OF EXPLORATORY TRENCH (1998 Report)
T-10	........APPROX. LOCATION OF EXPLORATORY TRENCH (2001 Report)
?	........APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

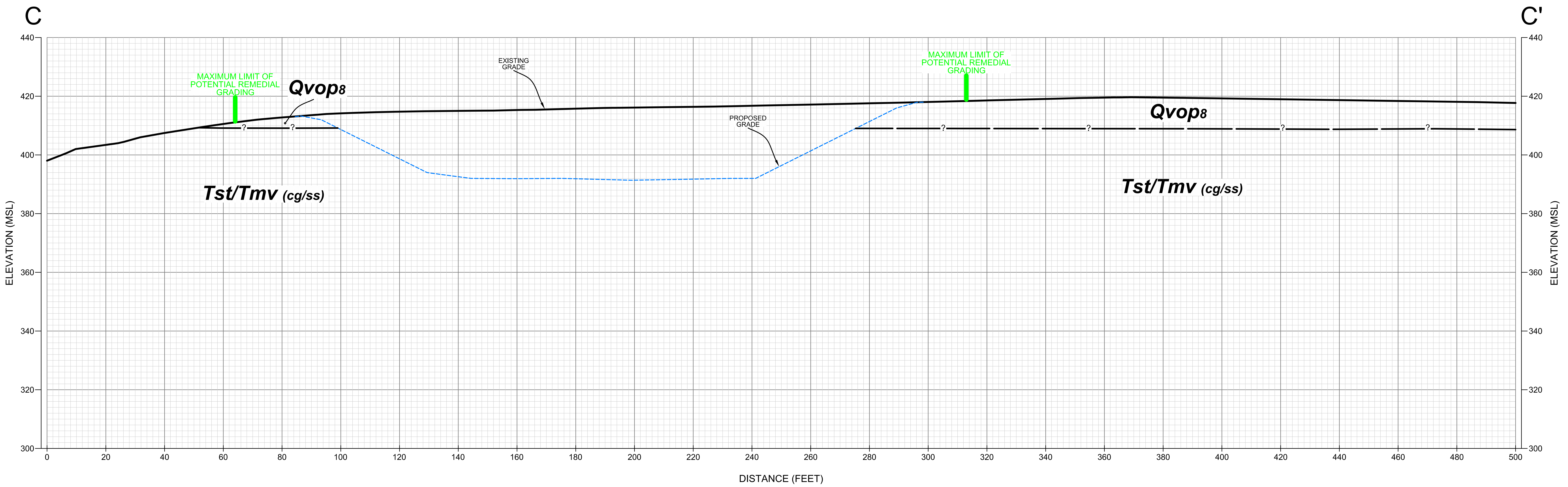
GEOLOGIC CROSS - SECTIONS

MERGE 56
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

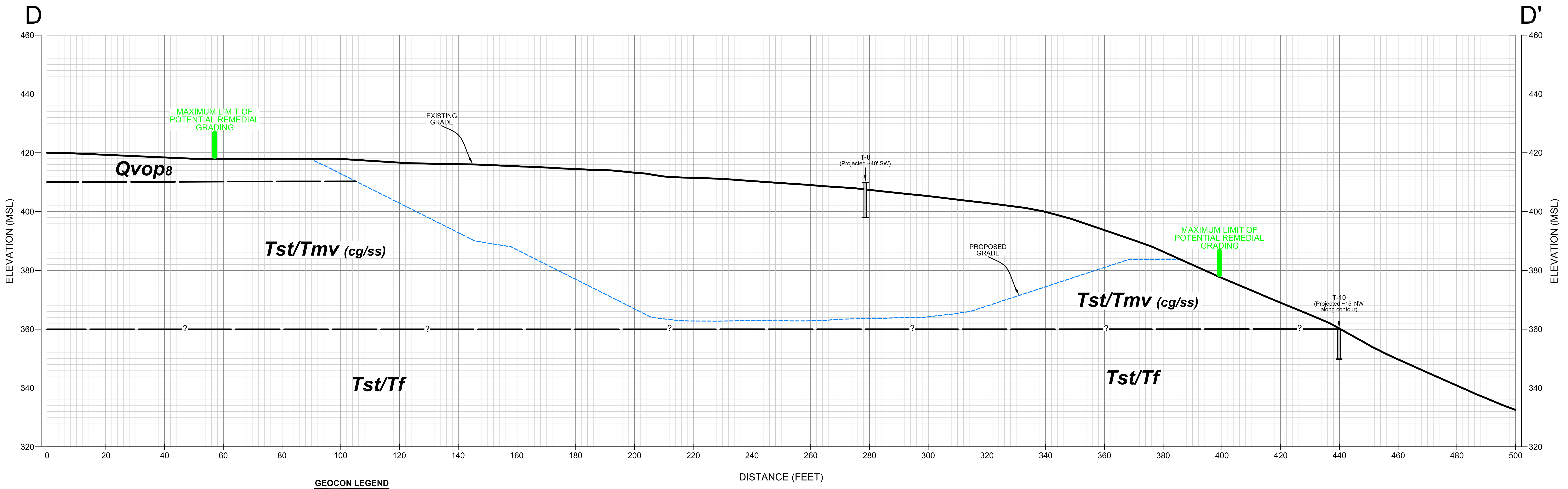
SCALE 1" = 20'
DATE 08 - 29 - 2014
PROJECT NO. 06021 - 32 - 04
FIGURE 3
SHEET 1 OF 1

Plotted:08/28/2014 9:03AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06021-32-04 MERGE 56\SHEETS\06021-32-04 Cross-Sections.dwg



GEOLOGIC CROSS-SECTION C-C'

SCALE: 1" = 20' (Vert. = Horiz.)



GEOLOGIC CROSS-SECTION D-D'

SCALE: 1" = 20' (Vert. = Horiz.)

GEOCON LEGEND

Qpf ....PREVIOUSLY PLACED FILL
Qal ....ALLUVIUM
Qvop8 ....VERY OLD PARALIC DEPOSITS
Tst/Tmv (ss) ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-SANDSTONE FACIES
Tst/Tmv (cg) ....STADIUM CONGLOMERATE / MISSION VALLEY FORMATION-CONGLOMERATE FACIES
Tst/Tf ....STADIUM CONGLOMERATE / FRIARS FORMATION
T-4 ▯ ....APPROX. LOCATION OF EXPLORATORY TRENCH (1998 Report)
T-10 ▮ ....APPROX. LOCATION OF EXPLORATORY TRENCH (2001 Report)
? ....APPROX. LOCATION OF GEOLOGIC CONTACT
(Queried Where Uncertain)

GEOLOGIC CROSS - SECTIONS

MERGE 56
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE 1" = 20'
DATE 08 - 29 - 2014
PROJECT NO. 06021 - 32 - 04
FIGURE 4
SHEET 1 OF 1

Plotted:08/28/2014 9:04AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\06021-32-04 MERGE 56\SHEETS\06021-32-04 Cross-Sections.dwg

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 06021-32-04
October 13, 2014

Latitude 33
9968 Hibert Street
San Diego, California 92131

Attention: Mr. Jim Kilgore

Subject: UPDATE LETTER AND RESPONSE TO GEOTECHNICAL REVIEW COMMENTS
MERGE 56 (FORMERLY RHODES CROSSING)
SAN DIEGO, CALIFORNIA

References:

1. *Geotechnical Investigation, Rhodes Property, San Diego, California,* dated July 2, 1998 (Project No. 06021-32-01).

2. *Supplemental Soil and Geologic Reconnaissance, Camino Ruiz Roadway Extension, San Diego, California*, dated March 16, 2001 (Project No. 06517-32-02).

3. *Merge 56, (Formerly Rhodes Crossing), Planned Development Permit (PDP No. 53203), Site Development Permit (SDP No. 53204, No. 40-0386, No. 3278), Conditional Use Permit (CUP No. ______), Vesting Tentative Map (No. 7938), Camino Del Sur and Carmel Mountain Road, San Diego, California*, prepared by Latitude 33, Sheets 1 through 35, revision date September 9, 2014.

Dear Mr. Kilgore:

This correspondence has been prepared to respond to the comments contained in the September 26, 2014, *Cycle Issues* prepared by Mr. Jim Quinn from the City of San Diego, LDR-Geology department. Each issue along with our response is presented below. In addition, we are in the process of obtaining a 560 Permit through the City of San Diego in order to prepare an update geotechnical report that will include supplemental subsurface information.

Issue 3: *Submit an addendum geotechnical report or update letter that specifically addresses the current site conditions and proposed development, and addresses or provides the following:*

Response: This correspondence serves as the update letter and the following responses address the reviewer’s comments. An update geotechnical report including additional subsurface information will be prepared in the near future.

Issue 8: *Confirm that the existing and proposed slopes in the area of the proposed development will have a factor of safety of 1.5 or greater with respect to gross and surficial slope stability following project completion.*

Response: Provided the recommendations presented in Reference Nos. 1 and 2, and subsequent updates, are implemented during design and construction, the slopes on site will possess a factor of safety of at least 1.5 for both gross and surficial stability following project completion.

In addition, we have included the following letters and report prepared by Geocon that address previous LDR review comments with respect to slope stability of the major slopes for the site:

1. *Response to City of San Diego Review, (for) Rhodes Crossing, San Diego, California,* dated March 21, 2003 (Project No. 06021-32-02).

2. *Addendum Geotechnical Consultation (for) Camino Del Sur, San Diego, California,* dated April 15, 2003 (Project No. 06517-32-02).

3. *Slope Stability Consultation (for) Camino Del Sur, North of Doormouse Road and South of the Rhodes Property, San Diego, California,* dated December 30, 2003 (Project No. 06517-32-02).

4. *Stability of Temporary Cut Slope Slopes for Possible Buttresses (for) Camino Del Sur, North of Doormouse Road and South of the Rhodes Property San Diego, California* dated August 10, 2004 (Project No. 06517-32-02).

Issue 17: *Submit the geotechnical report dated 2001 referenced on the geologic map provided with the "Update Letter and Response to Geotechnical Review Comments, Merge 56 (Formerly Rhodes Crossing), San Diego, California," prepared by Geocon Inc., dated August 29, 2014. Alternatively, provide an addendum geotechnical report or update letter that addresses geologic conditions and potential geologic hazards of the area of the proposed extension of Camino Del Sur and provides the logs of the subsurface exploration.*

Response: A copy of our report entitled *Supplemental Soil and Geologic Reconnaissance, Camino Ruiz Roadway Extension, San Diego, California,* dated March 16, 2001 (Project No. 06517-32-02), has been included.

Issue 18: *The project's geotechnical consultant indicates that an update geotechnical report including additional subsurface information will be performed at a later date. That study should be conducted and the report submitted at this time if necessary to address potential geologic hazards, mitigation measures, limits of remedial grading, or storm water BMP's.*

Response: Based on the subsurface studies and hypothetical analyses performed to date, it is our opinion that the future update geotechnical report is not necessary to address potential geologic hazards, mitigation measures, limits of remedial grading, or storm water BMP's for the site. The proposed study and report is intended to supplement and finalize the previous geotechnical information in order to assist potential contractors during the project bidding process.

Issue 19: *The project's geotechnical consultant indicates "provided the recommendations presented in reference no. 1, and subsequent updates, are implemented during design and construction, the slopes on site will possess a factor of safety of at least 1.5 for both gross and surficial stability following project completion." Submit the "subsequent updates" and all geotechnical reports pertinent to the proposed development. Alternatively, submit an addendum geotechnical report or update letter that includes all pertinent information.*

Response: We have included the reports and consultation letters (excluding Reference No. 1) pertinent to the proposed development (as referenced in Issue No. 8 and 17 responses).

Issue 20: *Grading associated with the proposed extension of Camino Del Sur crosses Geology Hazard Categories 23 and 53. The project's geotechnical consultant must indicate if the geologic structure is favorable or adverse with respect to the proposed cut slopes shown on the development plans.*

Response: Based on the existing subsurface data, no adverse or unfavorable geologic conditions or structures were encountered within the proposed cut slope areas of the project.

Issue 21: *Proposed cut slopes for Camino Del Sur may encounter the Friars Formation, a slide prone formation. The consultant should include a site-specific description of the Friars Formation as part of their discussion of site geology and clarify if the proposed cut slope(s) in the Friars Formation will have a factor of safety of 1.5 or greater following completion of the proposed project.*

Response: A site-specific description of the Friars Formation and geologic structure is presented in the referenced report dated March 16, 2001, included herein. Provided the recommendations presented in Reference Nos. 1 and 2, and subsequent updates, are implemented during design and construction, the slopes on site will possess a factor of safety of at least 1.5 for both gross and surficial stability following project completion.

Issue 22: *The project's geotechnical should indicate if the proposed project will destabilize or result in settlement of adjacent property or the right of way.*

Response: Provided the recommendations presented in our reports are implemented during design and construction, settlement or destabilization of adjacent property or right-of-way should not occur.

If there are any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Troy K. Reist

Troy K. Reist
CEG 2408

PROFESSIONAL GEOLOGIST
TROY K. REIST
No. 2408
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Trevor E. Myers
RCE 63773

REGISTERED PROFESSIONAL ENGINEER
TREVOR E. MYERS
No. RCE63773
CIVIL
STATE OF CALIFORNIA

David B. Evans
CEG 1860

PROFESSIONAL GEOLOGIST
DAVID B. EVANS
No. 1860
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

TKR:DBE:dmc

Attachments: Report dated March 16, 2001
Letter dated March 21, 2003
Report dated April 15, 2003
Letter dated December 30, 2003
Letter dated August 10, 2004

(1) Addressee

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 06021-32-04
December 22, 2014

Latitude 33
9968 Hibert Street
San Diego, California 92131

Attention: Mr. John Arenz

Subject: GEOTECHNICAL SUMMARY REPORT/RESPONSE
TO GEOTECHNICAL REVIEW COMMENTS
MERGE 56 STOCKPILE PLAN
SAN DIEGO, CALIFORNIA

References:

1. *Geotechnical Investigation, Rhodes Property, San Diego, California,* dated July 2, 1998 (Project No. 06021-32-01).

2. *Update Letter and Response to Geotechnical Review Comments Merge 56 (formerly Rhodes Crossing), San Diego, California,* prepared by Geocon Incorporated, dated August 29, 2014 (Project No. 06021-32-04).

3. *Merge 56, (Formerly Rhodes Crossing), Planned Development Permit (PDP No. 53203), Site Development Permit (SDP No. 53204, No. 40-0386, No. 3278), Conditional Use Permit (CUP No. ______), Vesting Tentative Map (No. 7938), Camino Del Sur and Carmel Mountain Road, San Diego, California,* prepared by Latitude 33, Sheets 1 through 35, revision date September 9, 2014.

4. *Grading (Disposal Site) Plans for Rhodes Crossing Units 1 & 6,* Sheets 1 through 3, prepared by Hunsaker & Associates, print date August 26, 2014.

Dear Mr. Arenz:

This correspondence has been prepared to respond to Issue No. 2 contained in the September 25, 2014, *Cycle Issues* document prepared by Mr. Jim Quinn from the City of San Diego, LDR-Geology department. The remaining items on Mr. Quinn's correspondence are related to the civil plans and the engineer of record. The geotechnical issue along with our response is presented below.

Issue No. 2: *The submitted report is over three years old and does not specifically address the proposed grading. Submit a geotechnical investigation report prepared in accordance with the City's "Guidelines for Geotechnical Reports" that specifically addresses and provides recommendations for the proposed grading plans.*

Response: Reference No. 2 serves as an update correspondence to Reference No. 1 regarding the overall Merge 56 grading. A more comprehensive update geotechnical report, including additional subsurface information, will be submitted at a later date. We have reviewed the stockpile grading plan (Reference No. 4) which is the subject of this correspondence.

The plan indicates that excess soil from grading of Units 1 and 6 will be placed in a stockpile in the southern portion of Merge 56 (residential) adjacent to future Carmel Mountain Road. We understand that the volume of the stockpile will be approximately 100,000 cubic yards. An access road off of existing Carmel Mountain Road will provide ingress and egress to the stockpile during grading operations. Access road grading consists of cuts and fills on the order of 5 and 10 feet, respectively with 2:1 (horizontal:vertical) slopes. The stockpile itself will have 2:1 slopes up to approximately 20 feet in height. Similarly, the thickness of the embankment will be approximately 20 feet.

A review of Reference Nos. 1 and 2 indicate that the stockpile will be placed on relatively flat terrain underlain by a thin mantle of topsoil and Quaternary-age Terrace Deposits (Qvop8). Undifferentiated Stadium Conglomerate/Mission Valley Formation underlies the Terrace Deposits. The geologic units that will be present beneath the proposed stockpile are described on the log to Boring No. 4 contained in Reference No. 1. The access road grading will encounter similar units.

Based on a review of the proposed grading plan (reference No. 4), and referenced reports, it is our opinion that no soil or geologic conditions exist that would preclude the temporary grading of the property, as presently planned, provided the recommendations of Reference No. 1 are followed. It is presumed that, since the grading is temporary and primarily located in future cut areas, remedial grading would not be performed beneath the embankments.

If there are any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Joseph J. Vettel
GE 2401

REGISTERED PROFESSIONAL ENGINEER
JOSEPH J. VETTEL
No. 2401
GEOTECHNICAL
STATE OF CALIFORNIA

David B. Evans
CEG 1860

PROFESSIONAL GEOLOGIST
DAVID B. EVANS
No. 1860
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

JJV:DBE:dmc

(4) Addressee
(2/del) Hunsaker & Associates
Attention: Mr. John Rivera

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 06021-32-05
December 1, 2016

Latitude 33
9968 Hilbert Street
San Diego, California 92131

Attention: Mr. Jim Kilgore

Subject: REVIEW OF GEOLOGIC SUMMARY
MERGE 56
SAN DIEGO, CALIFORNIA

Reference: Merge 56 Environmental Impact Report, Section 7.1.5 entitled *Geologic Conditions*, prepared by Baranek Consulting Group, dated November, 2016.

Dear Mr. Kilgore:

In accordance with the request of Ms. Kim Baranek, of Baranek Consulting Group, we have reviewed the referenced section of the project Environmental Impact Report (EIR). The purpose of our review was to provide an opinion regarding the accuracy of the information contained in the document. Based on our review, it is our opinion that the geologic related information contained in the referenced section of the EIR is generally accurate.

If there are any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

David B. Evans
CEG 1860

PROFESSIONAL GEOLOGIST
DAVID B. EVANS
NO. 1860
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

DBE:dmc

(2) Addressee

APPENDIX I

Water Supply Assessment Report

2014000419

THE CITY OF SAN DIEGO

MEMORANDUM

DATE: December 9, 2014

TO: Elizabeth Shearer-Nguyen, Senior Planner, Development Services

FROM: Seevani Bista, Senior Water Resources Specialist, Public Utilities Department

SUBJECT: Water Supply Assessment (WSA) Report - Merge 56 Development Project (Project No. 360009/ SAP No. 24004023)

In response to your request, please find attached WSA for Merge 56 Development Project approved by Deputy Director of the Long-Range Planning and Water Resources Division, Public Utilities.

The Public Utilities Department (Department) prepared this WSA to assess whether sufficient water supplies are or will be available to meet the projected water demands of the project. The findings verify that there is sufficient water supply to serve existing demands, projected demands of the project, and future water demands within the Water Department's service area in normal and dry year forecasts during a 20-year projection.

Should there be any comments on the WSA at the conclusion of the public review process of the EIR, please forward them for our review and comments for our review. Please provide us a copy of the EIR after the City Council approval.

If you have any questions please call me at (619) 533-4222.

Seevani Bista for

AK/tm

Attachment: Water Supply Assessment Report

cc: Ray Palmucci, Deputy City Attorney, Office of the City Attorney
Marsi A. Steirer, Deputy Director, Public Utilities Department
George Adrian, P.E. Principal Water Resources Specialist
Jeff Peterson, Development Project Manager
Anas Kaziha, Junior Engineer-Civil
RMU 6.8.4

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

WATER SUPPLY ASSESSMENT REPORT

Merge 56 Development Project

Prepared by:

City of San Diego Public Utilities Department

Reviewed by:

Marsi A Steirer 12/8/14

Marsi A. Steirer, Deputy Director **Date**
Long-Range Planning & Water Resources Division

Prepared: December 2014

City of San Diego Public Utilities Department
Water Supply Assessment Report

Merge 56 Development Project

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Section 1 - Purpose

On January 1, 2002, Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) took effect. The intent of SB 610 and SB 221 was to improve the link between information on water supply availability and certain land-use decisions made by cities and counties. Under SB 610 (codified in the Water Code beginning at Section 10910), a water supply assessment (WSA) must be furnished to cities and counties for inclusion in any environmental documentation of projects (defined in the Water Code) that propose to construct 500 or more residential units, or that will use an amount of water equivalent to what would be used by 500 residential units, and are subject to the California Environmental Quality Act (CEQA). Under SB 221, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply or water supply verification (WSV).

Not every project that is subject to the requirements of SB 610 is also subject to the mandatory water verification of SB 221 (e.g., if subdivision map approval is not required). Conversely, not every project that is subject to the requirements of SB 221 must also obtain a SB 610 water supply assessment.

A foundational document for compliance for both SB 610 and SB 221 is the Urban Water Management Plan (UWMP) of the relevant water agency. Both of these statutes repeatedly identify the UWMP as a planning document that can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete UWMPs will allow water suppliers to use UWMPs as a foundation to fulfill the specific requirements of the two statutes. Cities, counties, water districts, property owners and developers utilize this document when planning for and proposing new projects. It is crucial that cities, counties and water suppliers work closely when developing and updating these planning documents. The City of San Diego's 2010 UWMP, which is used as the basis for this Report (WSA), was adopted by the San Diego City Council in June 2011.

The City of San Diego (City) Development Services Department (DSD) requested the Public Utilities Department (Department) prepare this WSA as part of the environmental review for the Merge 56 Development Project (Project). A more detailed description of the Project is provided in Section 2 of this WSA. This WSA evaluates water supplies that are or will be available during normal, single-dry year, and multiple-dry water years during a 20-year projection to meet the projected demands of the Project, in addition to existing and planned future water demands of the Department. This WSA provides an assessment of the availability of sufficient water supplies for the Project only, and does not constitute approval of the Project.

This WSA also includes identification of existing water supply entitlements, water rights, water service contracts, or agreements relevant to the identified water supply for the Project and quantities of water received in prior years pursuant to those entitlements, rights, contracts and agreements.

This Report has been prepared in compliance with the requirements under SB 610 by the Department in consultation with DSD, the San Diego County Water Authority (Water Authority) and the Metropolitan Water District of Southern California (MWD).

Section 2 - Project Description

The proposed project (Merge 56 Development Project) is situated in the communities of Torrey Highland and Rancho Peñasquitos, immediately adjacent to the State Route 56 (SR-56) right-of-way. The property consists of 41.34 of undeveloped land in the north-central portion of the City of San Diego. Regional access to the site is from SR-56, Interstate 5 (I-5) and Interstate 15 (I-15). Local access to the site is from the southern terminus of Camino Del Sur and Carmel Mountain Road, as well as from the existing section of Camino Del Sur between Dormouse Road and Park Village Drive.

The project site map is shown in Figure 2-1.

FIGURE 2-1
VICINITY MAP OF PROJECT

The Merge 56 Development Project involves a Community Plan Amendment (CPA) to amend the site's land use designation in the Torrey Highlands Subarea Plan from Commercial Regional and Medium High Density Residential to Local Mixed Use South to allow for a mix of commercial, professional, corporate, scientific/medical office, hotel uses, as well as varying residential land uses. A corresponding rezone is proposed to modify underlying zoning from Agriculture (AR-1-1) to Community Commercial (CC-3-5) and Residential Small Lot (RX 1-2). The CPA was initiated by the Planning Commission in September 2013.

The Project applicant proposes to reconfigure land uses throughout the project. Instead of constructing 273,855 square feet of self-storage, 250,000 square feet of commercial and 242 multi-family residences, the Merge 56 Development Project proposes approximately 525,000 square feet of sustainable building design including commercial, office, theater and hotel uses and up to 242 residential dwelling units. The office component in the project consists of 296,263 square feet included corporate and medical office. The remaining 228,737 square feet will be retail including a cinema, hotel, full service fitness center, grocery store, and market hall (indoor farmers market). The "other retail" category is similar to the market hall dispersed throughout the center.

A comparison of the proposed and existing development within the proposed project boundary is tabulated below in Table 2-1.

Table 2-1
Existing and Proposed Development

Development Type	Existing	Proposed
Residential (Dwelling Units)	*Units/Rooms*	
Single-Family	0	84
Multi-Family	242	158
Hotel	0	120
Non-Residential	*Square Foot*	
Self Storage	273,855	-
Commercial Development	250,000	
- Drug Store		15,000
- Unnamed		9,000
- Market Hall		10,564
- Other Retail		39,262
- Office		296,263
- Cinema		45,453(1800 seats)
- Fitness		21,885
- Grocery		29,573

The residential units would include a mix of housing types including multi-family (approximately 47 affordable units), townhomes (approximately 111 units), and single-family (approximately 84 units). The project will implement LEED elements such as recycled irrigation, and water conservation technology for buildings. All landscape irrigation systems will use an approved rain sensor shutoff device, low precipitation rate sprinklers, and any runoff will be used to irrigate the swale vegetation going through the development.

Section 3 - Findings

Water Assessment

Project: This Report identifies that the proposed water demand projections for the Project are included in the regional water resource planning documents of the City, Water Authority and MWD. Current and future water supplies, as well as actions necessary to develop the future water supplies, have been identified. This Report demonstrates that there will be sufficient water supplies available during normal, single-dry year, and multiple-dry water years over a 20-year projection to meet the unanticipated demands of the Project.

The Water Authority's 2010 UWMP provides for a comprehensive planning analysis at a regional level, and includes water use associated with accelerated forecasted residential development as part of its municipal and industrial sector demand projections. These housing units were identified by the San Diego Association of Government (SANDAG) land use plan in the course of its regional housing needs assessment, but are not yet included in existing general land use plans of local jurisdictions. The demand associated with accelerated forecasted residential development is intended to account for SANDAG's land-use development currently projected to occur between 2035 and 2050, but has the likely potential to occur on an accelerated schedule. SANDAG estimates that this accelerated forecasted residential development could occur within the planning horizon (2010 to 2035) of the 2010 UWMP. These units are not yet included in local jurisdictions' general plans, so their projected demands are incorporated at a regional level. When necessary, this additional demand increment, termed Accelerated Forecasted Growth, can be used by member agencies to meet the demands of development projects not identified in the general land use plans.

As demonstrated in Table 3-1 of this Report, prepared by the Department in compliance with the requirements of SB 610, using the City's and Water Authority's 2010 UWMP based upon San Diego Association of Governments (SANDAG) Series 12 Forecast land use, there is sufficient water planned to supply the Project's estimated annual average usage. The projected water demands of the Project are 159,953 gallons per day (gpd) or 179 acre feet per year (AFY). In the City's 2010 UWMP, the planned water demands of this project site are 95,744 gpd or 107 AFY. The remaining portion of the estimated 64,209 gpd or 72 AFY is accounted for through the Accelerated Forecasted Growth demand increment of the Water Authority's 2010 UWMP. As documented in the Water Authority's 2010 UWMP, the Water Authority is planning to meet future and existing demands which include the demand increment associated with the accelerated forecasted growth. The Water Authority will also assist its member agencies in tracking the certified Environmental Impact Reports (EIRs) provided by the agencies which include water supply assessments that utilize the accelerated forecasted growth demand increment, to demonstrate adequate supplies for the development. In addition, the next update of the demand forecast for the Water Authority's 2015 UWMP will be based on SANDAG's most recently updated forecast, which will include the Project.

Existing and Future Developments Planned to occur by 2035: The City's 2010 UWMP demonstrates there will be sufficient water supplies available to meet demands for existing and planned future developments that are projected to occur by 2035. Based on a normal water supply year, the estimated water supply projected in five-year increments for a 20-year projection will meet the City's projected water demand of 240,472 acre-feet[A] (AF) in 2015 to 298,860 AF in 2035 (**Table 6-5**) for these developments. Similarly, based on a single-dry year forecast (**Table 6-7**), the estimated water supply will meet the projected water demand of 318,586 AF (2035). Based on a multiple-dry year, third year supply (**Table 6-8**), the estimated water supply will meet the projected demands of 281,466 AF (2015); 303,004 AF (2020); 322,166 AF (2025); 334,720 AF (2030); and 346,823 AF (2035).

TABLE 3-1
WATER DEMAND ANALYSIS

Planned Water Demands for the Project Site included in the 2010 UWMP				
Category	**Quantity**		**Estimated Potable Water Use in**	
			Gallons per Day (GPD)	**Acre-Feet per Year (AFY)**
2035				
Single-family Units[1]	*0*		*0*	*0*
Multi-family Units[2]	*544*		*95,744*	*107*
Employee	*0*		*0*	*0*
	Total		***95,744***	***107***
Projected Water Demands for MERGE 56 Project				
	Dwelling Units		**GPD**	**AFY**
Single-family Units[1]	84		30,206	34
Multi-family Units[2]	158		27,808	31
Retail	**Square Foot**	**Employee**		
Drug Store[3,4]	15,000	30	1,800	
Unnamed[3,4]	9,000	18	1,080	
Market Hall[3,4]	10,564	21	1,268	
Other Retail[3,4]	39,262	79	4,711	
Retail Total	**74,068**	**148**	**8,859**	**10**
Office[3,5]	296,263	1,077	64,639	72
Cinema[6]	45,453	1800 Seats	9,000	10
Grocery[7]	29,573	59	5,545	6
Hotel[8,9]	120	Rooms	12,288	14
Fitness[10]	21,885		1,607	2
	Total		**159,953**	**179**
Net Water Demands			**AFY**	
Projected			179	
City of San Diego 2010 UWMP - Planned			107	
Planned from Water Authority's Accelerated Forecasted Growth			72	
Unanticipated Demand			0	

Please see next page for notes.

[A] An acre-foot of water equals 325,851 gallons, which is enough water for two average families of four for one year.

Table 3-1 Notes:

1. 116 gpcd in the City's acceptable standard for single-family water consumption (Includes landscaping water demand). The person per household (residential) is estimated at 3.1.
2. 80 gpcd is the City's acceptable standard for multi-family water consumption (includes landscaping water demands). The person per household (residential) is estimated at 2.2.
3. The utilization of 60 gallons per person per day is the City's acceptable standard for employment water use (Includes nominal landscaping water demand).
4. Number of retail employees estimated at 500 sq ft per employee (City Data).
5. Number of office employees estimated at 275 sq ft per employee (City Data).
6. 5 gallons per seat for movie theaters according to the AWWA Design and Construction of small water systems also found on the Amy Vickers book "Water Use and Conservation" Copy Right 2001.
7. The utilization of 93.75 gallons per employee per day (ged) are the standards for grocery stores (Amy Vickers).
8. AWWA Research Foundation Data: For Hotel low End Water Usage 107 Gallons/room/day, High End Usage 148 Gallons/room/day; Average 128 Gallons/room/day.
9. Based on research done for Hotel calculations the occupancy rate is 80 percent for San Diego (City Data).
10. By gathering different bills from 24 hour fitness centers around San Diego we were able to create a regression analysis to determine how much GPD would be used by this gym size, the value we got was 1607 GPD

Conclusion

In summary, these findings substantiate that there is sufficient water supply planned to serve this Project's future water demands within the Department service area in normal, single-dry year, and multiple-dry water year forecasts.

Therefore, this Report concludes that the projected level of water use for this Project is within the regional water resource planning documents of the City, the Water Authority and MWD. Current and future water supplies, as well as the actions necessary to develop these supplies, have been identified in the water resources planning documents of the Department, the Water Authority, and MWD to serve the projected demands of the Project, in addition to existing and planned future water demands of the Department.

Section 4 - City of San Diego Public Utilities Department

The City purchased its initial water system in 1901 from the privately owned San Diego Water & Telephone Company. Since then, continual expansion of the water system has been required to meet the demands of the growing population of the City. To meet the demand, the Department purchased a number of reservoirs between 1913 and 1935 to supplement local water supplies. Despite low annual precipitation in the area (approximately 10 inches per year), these reservoirs supplied the City's growing demands until 1940.

The need to import water emerged with the increased demand generated by the presence of the United States Navy prior to and during World War II, and the ensuing population growth. As a result, the Department and other local retail water distributors formed the Water Authority in 1944 for the purpose of purchasing Colorado River water from MWD. The Department and other local retail water distributors began receiving imported water from the Colorado River in 1947.

Today, the Department treats and delivers more than 200,000 AFY of water to more than 1.3 million residents. The water system extends over 404 square miles, including 342 square miles in the City. The Department potable water system serves the City and certain surrounding areas, including both retail and wholesale customers. The Project is located within the Department service area.

In addition to delivering potable water, the City has a recycled water program. Its objectives are to optimize the use of local water supplies, lessen reliance on imported water and free up capacity in the potable system. Recycled water provides the City a dependable, year-round, locally produced and controlled water resource.

4.1 Overview of Potable System Facilities

The water system consists of nine raw water storage facilities with over 408,000 AF of storage capacity, three water treatment plants, 28 treated water storage facilities, and more than 3,212 miles of transmission and distribution lines.

The Department maintains and operates nine local surface raw water storage facilities, which are connected directly or indirectly to the City's water treatment operations. The Lower Otay, Barrett, and Morena Reservoirs (135,349 AF total capacity) service the Otay Water Treatment Plant in south San Diego; the El Capitan, San Vicente, Sutherland, and Lake Murray Reservoirs (236,311 AF total capacity) service the Alvarado Water Treatment Plant in central San Diego; and the Miramar Reservoir (6,682 AF total capacity) services the Miramar Water Treatment Plant in north San Diego. Lake Hodges Reservoir has a total capacity of 30,251 AF and is connected to Olivenhain Reservoir, which is owned by Water Authority. Olivenhain Reservoir is connected to the Water Authority's second aqueduct. Through this connection, Hodges water can be delivered to all City treatment plants. The City has the ability to access 50 percent of the local water available in Hodges Reservoir via the Water Authority's delivery system.

The Department maintains and operates three water treatment plants with a combined total rated capacity of 423,860 AFY (378.4 million gallons per day MGD). The Miramar Water Treatment

Plant (Miramar WTP), originally constructed in 1962, has a rated capacity of 161,300 AFY (144 MGD) with the ability to increase to 240,830 AFY (215 MGD) after the replacement of the two old clearwells in 2016. The Miramar WTP generally serves the City's geographical area north of the San Diego River (north San Diego). The Alvarado Water Treatment Plant (Alvarado WTP), operational since 1951, had an initial capacity rating of 134,417 AFY (120 MGD). Several hydraulic improvements and upgrades were completed in 2011 which increased the capacity of the plant to 224,028 AFY (200 MGD). The California Department of Public Health (CDPH) has approved this rating for the Alvarado WTP. The Alvarado WTP generally serves the geographical area from National City to the San Diego River (central San Diego). The Otay Water Treatment Plant (Otay WTP) was constructed in 1940, and has a current rated capacity of 38,533 AFY (34.4 MGD), which meets current and short-term forecasted demands. The Otay WTP has hydraulic capacity to increase to 44,806 AFY (40 MGD) in the future. In order to do so, approval from CDPH is required, based upon a future high filtration rate study. The Otay WTP generally serves the geographical area bordering Mexico (south San Diego) and parts of the southeastern portion of central San Diego. All upgrade work was completed in 2012 including the construction of a third flocculation and sedimentation basin, filter piping and media improvements.

The Department maintains and operates 28 treated water storage facilities including steel tanks, standpipes, concrete tanks and rectangular concrete reservoirs, with capacities varying from less than one to 35 million gallons.

The water system consists of more than 3,212 miles of pipelines, including transmission lines up to 84 inches in diameter and distribution lines as small as four inches in diameter. Transmission lines are pipelines 16 inches and larger in diameter that convey raw water to the water treatment plants and convey treated water from the water treatment plants to the treated water storage facilities. Distribution lines are pipelines 16 inches and smaller in diameter that directly services the retail users connected to a meter. In addition, the Department maintains and operates 49 water pump stations that deliver treated water from the water treatment plants to approximately 279,557 metered service connections in 128 different pressure zones. The Department also maintains several emergency connections to and from neighboring water agencies, including the Santa Fe Irrigation District (Miramar WTP), the City of Poway (Miramar WTP), Olivenhain Municipal Water District (Miramar WTP), the Cal-American Water Company (Alvarado and Otay WTP), Sweetwater Authority (Otay WTP), and the Otay Water District (Otay WTP).

4.2 Overview of Recycled System Facilities

The City's recycled water system consists primarily of two water reclamation plants with a combined total wastewater treatment capacity of 50,406 AFY (45 MGD), three recycled water storage facilities with over 12 million gallons (12 MG) of storage capacity, and more than 94 miles of transmission and distribution lines.

Located in the Miramar area, the North City Water Reclamation (NCWRP) treats an average of 18,482 AFY (16.5 MGD) of wastewater, although the plant has an ultimate treatment capability of 33,604 AFY (30 MGD). In Fiscal Year (FY) 2014, 8,417 AFY (7.5 MGD) was beneficially reused. The Department maintains and operates the Northern Service Area distribution system which consists of 91 miles of recycled water pipeline, two reservoirs, two pump stations, with service to 574 meters.

Located at the end of Dairymart Road, near the International Border with Mexico, the South Bay Water Reclamation Plant (SBWRP) treats an average of eight (8) MGD of wastewater, although the Plant has a treatment capability of 16,802 AFY (15 MGD). In FY 2014, an average of 4,804 AFY (4.3 MGD) was beneficially reused. The Department maintains and operates the Southern Service Area distribution system which consists of three miles recycled water pipeline, one storage tank, one pump station and seven meters.

Section 5 - Existing and Projected Supplies

The Department relies on imported water as its major water supply source, and is a Water Authority member agency. The Water Authority is a member agency of MWD. The statutory relationships between the Water Authority, MWD and its member agencies, respectively, establish the scope of the Department's entitlements to water from these two agencies. Due to the Department's reliance on these two agencies, this Report relies and includes information on the existing and projected supplies, supply programs, and related projects of the Water Authority and MWD.

The City relies on the long-term water resources planning documents of the Water Authority and MWD to support the work on this Report. These documents are available at the following websites and contacts:

San Diego County Water Authority

http://www.sdcwa.org/2010-urban-water-management-plan

Dana Friehauf, Principal Water Resources Specialist (858) 522-6749

Metropolitan Water District of Southern California

http://www.mwdh2o.com/mwdh2o/pages/yourwater/ywater01.html#RUWMP

MWD staff, (213) 217-6000

The Water Authority and MWD are actively pursuing programs and projects to diversify their water supply resources. A description of these efforts as well as the challenges facing the Water Authority and MWD can be found in the San Diego County Water Authority Official Statement, dated February 13, 2013, relating to Water Revenue Refunding Bonds 2013A, and MWD's Official Statement, dated March 13, 2014, relating to Water Revenue Refunding Bonds, 2014 Series A. These Official Statements are available at the following websites:

http://www.sdcwa.org/sites/default/files/files/finance-investor/2013Bond.pdf

http://mwdh2o.com/mwdh2o/pages/finance/PDFs/2014-Ser.A-B-FOS.pdf

A brief overview of MWD and the Water Authority, including the Department relationship to these agencies, is included below.

A description of local surface and local recycled water supplies available to the Department can be found in Section 5.4 of this Report.

This information is current at the time this document was prepared.

5.1 Metropolitan Water District of Southern California

Metropolitan Water District (MWD) was created in 1928, under the authority of the Metropolitan Water District Act (California Statutes 1927, Chapter 429, as reenacted in 1969 as Chapter 209, as amended) (the "MWD Act"). MWD's primary purpose is to provide a supplemental supply of wholesale water for domestic and municipal uses to its constituent agencies. The MWD service area comprises approximately 5,200 square miles and includes portions of the six counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura. There are 26 member agencies of MWD, consisting of 14 cities, 11 municipal water districts and the San Diego County Water Authority (Water Authority). A Board of Directors, currently numbering 37 members, governs MWD. Each constituent agency has at least one representative on the MWD Board. Representation and voting rights are based upon the assessed valuation of property within each constituent agency. The Water Authority has four members on the MWD Board and about 17 percent of the weighted vote. The total population of the MWD service area is currently estimated at approximately 19 million.

MWD's existing water supplies have been historically sufficient to meet demands within its service area during years of normal precipitation. Although MWD plans and manages reserve supplies to account for normal occurrences of drought conditions, regulatory actions, including, but not limited to, restrictions under the Federal and California Endangered Species Acts, have at times placed limitations on MWD's ability to provide water to its member agencies. In the future, population growth, regulatory restrictions, increased competition for low-cost water supplies, and other factors such as climate change could impact MWD's ability to supply its member agencies even in normal years.

MWD Water Supply

MWD's two major sources of water are from the Colorado River and the State Water Project (SWP).

Colorado River Water: The Colorado River was MWD's original source of water after its establishment in 1928. The MWD owned and operated Colorado River Aqueduct, is 242 miles long, starting at Lake Havasu and terminating at Lake Mathews in Riverside County.

Under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River" that govern the use of water from the Colorado River, California is entitled to 4.4 million acre-feet of Colorado River water annually. Additionally, California is entitled to one-half of any surplus water that may be available for shared use with Arizona and Nevada as determined on an annual basis by the United States Secretary of the Interior. Under the priority system that governs the distribution of Colorado River water made available to California, MWD holds the fourth priority right of 550,000 acre-feet per year and a fifth priority right of 662,000 acre-feet per year. MWD's fourth priority right is within California's basic annual apportionment of 4.4 million acre-feet; however, the fifth priority right is outside of this entitlement and therefore is not considered a firm supply of water. MWD also retains a "call" on 100,000 acre-feet per year on water transferred to the Coachella Valley Water

District and the Desert Water Agency, if needed, so long as they pay for the financial obligations associated with the water during the call period.

A study released in July 2014 by NASA and the University of California, Irvine found that the Colorado River basin had lost more than 75 percent of its water between late 2004 and early 2013. The overall loss was nearly 53 million acre-feet, which included a 41 million acre-feet loss of groundwater. Researchers are uncertain as to how much water is left in the groundwater basin

Several fish and other wildlife species either directly or indirectly have the potential to affect Colorado River operations, thus changing the amount of water deliveries to the Colorado River Aqueduct. A number of species that are on either "endangered" or "threatened" lists under the federal and/or California endangered species acts ("ESAs") are present in the area of the Lower Colorado River. MWD and other stakeholder agencies have developed a multi-species conservation program that allows MWD to obtain federal and state permits for any incidental take of protected species, resulting from current and future water and power operations of its Colorado River facilities and to minimize any uncertainty from additional listings of endangered species.

State Water Project: The State Water Projects (SWP) is owned by the State of California and operated by the State Department of Water Resources (DWR). The SWP's source waters originate in Northern California with water captured from the Feather River Watershed behind Lake Oroville Dam. The Oroville Dam releases water into the Feather River which is tributary to the Sacramento River, where it combines with other drainages from the western Sierras in the Sacramento-San Joaquin River Delta east of the San Francisco Bay Estuary. MWD receives water pumped from the Harvey O. Banks Pumping Plant in the southern portion of the Sacramento-San Joaquin River Delta, via the 444 mile-long California Aqueduct, to four delivery points near the northern and eastern boundaries of MWD. MWD is one of 29 agencies that have long-term contracts for water service from DWR, and is the largest agency in terms of the number of population served, the share of SWP water to which it is entitled, and the total amount of annual payments made to DWR. MWD's contract with DWR provides for the ultimate delivery of 1,911,400 acre-feet per year (46 percent of the total SWP entitlement). The SWP was originally intended to meet demands of 4.2 million acre-feet per year. Initial SWP facilities were completed in the early 1970s, and it was envisioned that additional facilities would be constructed as contractor demands increased. Several factors, including public opposition, increased costs, and increased non-SWP demands for limited water supplies, combined to delay the construction of additional facilities.

The quantity of SWP water available for delivery each year is controlled by hydrology, environmental and operational considerations. In addition to its importance to urban and agricultural water users, the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is of critical ecological importance. The Bay-Delta is the largest estuary on the west coast of the United States and provides habitat for more than 750 plant and animal species. One-hundred-fifty years of human activity have contributed to the destruction of habitat, the decline of several estuarine and anadromous fish species, and the deterioration of water quality. These activities include increasing water demands from urban and agricultural uses, the dredging and filling of tidal marshes, the construction of levees, urban runoff, agricultural drainage, runoff from abandoned mines, and the introduction of non-native species, thus affecting the supply and reliability of this source.

DWR has altered the operations of the SWP to accommodate species of fish listed under the ESAs. These changes in project operations have adversely affected SWP deliveries. The impact on total SWP operations attributable to the ESA listed Delta smelt and salmon species biological opinions combined is estimated to be one million acre-feet in an average year, reducing SWP deliveries from approximately 3.3 million acre-feet to approximately 2.3 million acre-feet for the year under average hydrology, and are estimated to range from 0.3 million acre-feet during critically dry years to 1.3 million acre-feet in above normal water years. SWP deliveries to contractors for calendar years 2008 through 2012 were reduced by a total of approximately 2.3 million acre-feet as a result of pumping restrictions. Based upon the latest verified information, pumping restrictions that are impacting the SWP allocations for 2013 have reduced exports by approximately 596,000 acre-feet through calendar year 2013.[C]

As a result of California experiencing the third year of drought and the driest year on record, the DWR announced a zero percent initial allocation of requested SWP requests for 2014. Due to the late winter storms the state has experienced, that initial allocation was raised to 5 percent in April 2014.[D]

5.2 San Diego County Water Authority

The Water Authority service area lies within the foothill and coastal areas of the westerly third of San Diego County, encompassing 952,208 acres (1,488 square miles). When the Water Authority was established in 1944, its service area consisted of 94,707 acres. Of the total population of San Diego County, 97 percent live within the Water Authority's service area. Growth has primarily resulted from the addition and annexation of service areas by member agencies. The City, with a population of 1.3 million served and a service area of 210,726 acres is by far the Water Authority's largest member agency and customer.

The Water Authority's service area is a semi-arid region where the natural occurrence of water from rainfall and groundwater provides a firm water supply for only a small portion of the water demands of the current population. Since 1990, the Water Authority has provided an average of 85 percent of the water supply within its service area. As a wholesaling entity, the Water Authority has no retail customers, and only serves its member agencies.

The Water Authority's mission is to provide its member agencies with a safe and reliable water supply. Historically, the principal source of supply for the Water Authority's service area has been water purchased from MWD for sale to the Water Authority's member agencies. However, drought conditions and population growth in the Water Authority's service area have highlighted the need for diversification of the region's water supplies. Consistent with its mission statement, the Water Authority has actively pursued a strategy of supply diversification that includes the

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[C] http://mwdh2o.com/mwdh2o/pages/finance/PDFs/2014-Ser.A-B-FOS.pdf

[D] http://www.water.ca.gov/waterconditions/

acquisition and importation of additional water supplies, the development of additional local water supply projects and augmentation of its water supply via local and regional water storage capacity. Water supplies utilized within the Water Authority service area originate from two sources: (1) water imported by the Water Authority and (2) local supplies (such as local runoff, groundwater, recycled water, and prospectively seawater desalination). Since 1990, local supplies have grown to constitute 15 percent of the Water Authority's water supply, and the Water Authority has implemented programs and supported new technologies in order to assist its member agencies in increasing this percentage. Although MWD remains the Water Authority's largest source of imported water, recent years have also seen the diversification of sources of imported water through core and spot water transfers with other agencies.

In late November 2012, the Water Authority's Board of Directors approved a 30-year Water Purchase Agreement with Poseidon Resources, a private investor-owned company, to purchase water from the proposed Carlsbad Desalination Plant, which is a fully-permitted ocean desalination plant and conveyance pipeline. The plant will produce 50 million gallons a day starting in 2016. By 2020, it will generate enough water to meet seven 7 percent of the region's current demands[E]. January 8, 2014 marks one year of construction putting the project a little more than 25 percent complete. The project is scheduled to be online by early 2016, though deliveries could begin as soon as the fall of 2015. As of May 29, 2014, the 10-mile pipeline that will connect the Carlsbad Desalination Plant to the Water Authority's distribution system is 50 percent complete.

The Quantification Settlement Agreement (QSA) for the Colorado River was completed in October 2003. This historic agreement was enacted to help settle disputes regarding the persistent over-drafting of the state's 4.4 million acre-foot basic annual apportionment of Colorado River water. The agreement includes a long-term transfer of conserved water from the Imperial Irrigation District to the Water Authority. The QSA also commits the state to a restoration path for the environmentally sensitive Salton Sea and provides full mitigation for these water supply programs. Specific programs under the QSA that directly benefit the Water Authority include the San Diego County Water Authority-Imperial Irrigation District water transfer agreement, which currently transfers 100,000 acre-feet of high priority Colorado River water to the Water Authority and will provide up to 200,000 acre-feet of water a year through water conservation measures in Imperial Valley in 2021. The QSA also allows for the transfer of water from the Imperial Irrigation District (IID), for water conserved through the implementation of the Water Authority performed projects to install concrete linings on portions of the previously earthen All-American and Coachella Canals. The canal lining projects reduced the losses of water that historically occurred through seepage. MWD assigned to the Water Authority its right to develop approximately 77,700 acre-feet of conserved Colorado River water annually.

The QSA ensures that the San Diego region receives a minimum of 75 years of stable Colorado River water supplies. On November 5, 2003, the IID filed a validation action in Imperial County Superior Court, seeking a judicial determination that 13 agreements associated with the San Diego

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[E] http://www.sdcwa.org/issue-desal
http://carlsbaddesal.com/

County Water Authority-Imperial Irrigation District water transfer and the QSA are valid, legal and binding. Other lawsuits also were filed contemporaneously challenging the execution, approval and implementation of the QSA on various grounds. All of the QSA cases were coordinated in the Sacramento Superior Court. A final judgment invalidating 11 of the 13 agreements in Phase 1 of the trial was entered on February 11, 2010, and subsequently appealed. On December 7, 2011 the Court of Appeal issued its opinion reversing the judgment and remanding to the trial court for further proceedings. The appellate Court decision resolved many issues in the case, including the validity and constitutionality of the QSA. Trial on compliance with the California Environmental Quality Act was held in November 2012. On June 4, 2013, the court validated the 2003 QSA and related 12 agreements regarding transfers and exchanges of Colorado River water between southern California water agencies. The IID, Coachella Valley Water District, MWD, and Water Authority all sought validation of the agreements from the court under California Water Code section 22762 and California Code of Civil Procedure section 860 et seq., quantifying the amount of Colorado River water each agency may divert and subsequently transfer. The court found the agreements to be valid and adopted in compliance with the requirements of the Brown Act and the California Environmental Quality Act (CEQA). The ruling represents the latest chapter in the longstanding dispute regarding the diversion and use of California's apportionment of the Colorado River under state and federal law.

The Water Authority has encouraged the development of additional local water supply projects such as water recycling and groundwater projects, through the award of Local Water Supply Development ("LWSD") incentives of up to $200 per acre-foot for recycled water and groundwater produced and beneficially reused within the Water Authority's service area. The purpose of the Water Authority's LWSD program is to promote the development of cost-effective water recycling and groundwater projects, that prevent or reduce a demand for imported water and improve regional water supply reliability. The LWSD Program reimburses member agencies for all, or a portion of the difference between the actual per acre-foot cost of producing recycled water, and the revenue generated by the LWSD participant through the sale of that acre-foot of recycled water (not to exceed $200 per acre-foot). In February 2008, the program was expanded to include funding for local brackish and seawater desalination projects.

5.3 2009 Comprehensive Water Package

On November 4, 2009, the California State Legislature passed a comprehensive package of water legislation (the "2009 State Water Legislation") that included five bills (four of which were subsequently signed by Governor Schwarzenegger) addressing California's statewide water situation, with particular emphasis on the San Francisco Bay/Sacramento-San Joaquin-Delta (Bay-Delta). The 2009 State Water Legislation included an urban water conservation mandate of 20 percent for most localities in the State by 2020, and new regulations establishing strategic monitoring of groundwater levels around the state. The 2009 State Water Legislation also created two new governmental agencies – the Delta Stewardship Council and the Sacramento-San Joaquin Delta Conservancy. The Delta Stewardship Council is charged with developing and implementing a Delta Plan, which would include the Bay Delta Conservation Plan, upon meeting certain conditions. The Sacramento-San Joaquin Delta Conservancy will implement ecosystem restoration activities in the Bay-Delta. In addition, the 2009 State Water Legislation included legislation addressing unauthorized Bay-Delta water diversions. At this time, it is not known what effect the 2009 State Water Legislation will have on future water supplies.

Additionally, the 2009 Legislation package included an $11.1 billion State general obligation bond measure. The water bond measure was originally certified to be on the State's 2010 ballot, but was subsequently pulled due to unfavorable public polling. That same bond measure was subsequently delayed twice. During the current 2013-2014 legislative session, several bills were introduced with the intent of reducing and reconfiguring the dedicated expenditures in the original water bond measure. In late 2014, the legislature introduced the "Water Quality, Supply, and Infrastructure Improvement Act of 2014" which proposed a trimmed down version of the 2009 bond measure for a total of $7.12 billion. The legislation was subsequently signed by Governor Brown on August 13, 2014 and placed on the November 2014 ballot as Proposition 1 for voter referendum. The ballot measure would fund a variety of state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration.

5.4 Public Utilities Department

The Department currently purchases approximately 85 to 90 percent of its water from the Water Authority, which supplies the water (raw and treated) through two aqueducts consisting of five pipelines. While the Department imports a majority of its water, it uses three local supply sources to meet or offset potable demands: local surface water, conservation, and recycled water.

The availability of sufficient imported and regional water supplies to serve existing and planned uses within the Department service area is demonstrated in the prior discussion on the water supply reliability of MWD and the Water Authority. The City has been receiving water from the Water Authority since 1947, and during the last 20 years purchased between 139,000 and 235,500 AFY. For CY 2014 water purchases totaled approximately 186,200 AF. Depending upon demands, growth and the success of local water supply initiatives, this could remain somewhat constant or increase up to a projected maximum of 295,998 AFY in 2035 during normal years. For the purpose of this analysis the maximum is used.

5.4.1 Demonstrating the Availability of Sufficient Supplies

Imported Supplies

Section 5, subdivision 11 of the County Water Authority Act states that the Water Authority "as far as practicable, shall provide each of its member agencies with adequate supplies of water to meet their expanding and increasing needs." Depending on local weather and supply conditions, the Water Authority provides between 75 to 95 percent of the total supplies used by its 24-member agencies. As mentioned in Section 4, the Public Utilities Department and other local retail water distributors formed the Water Authority in 1944 for the purpose of purchasing Colorado River water from the MWD.

Local Surface Water Supplies

The Department maintains and operates nine local surface raw water storage reservoirs which are connected directly or indirectly to water treatment operations. In the San Diego region, approximately 13 percent of local precipitation produces surface run-off to streams that supply Department reservoirs. Approximately half of this run-off is used for the municipal water supply, while the remainder evaporates during reservoir storage. In very wet years, the run-off remainder may spill over the reservoir dams and return to the Pacific Ocean. Average rainfall produces less than half of the average run-off in San Diego. The local climate requires about average rainfall to saturate the soils sufficiently for significant surface run-off to occur. Therefore, most of the run-off to reservoirs is produced in years with much greater than average rainfall. Some flooding may occur even during average or below average rainfall years if the annual rainfall is concentrated in a few intense storms.

The use of local water is affected by availability and water resource management policies. The Department's policy is to use local water first to reduce imported water purchases and costs. The Department also operates emergency and seasonal storage programs in conjunction with its policy.

The purpose of emergency storage is to increase the reliability of the imported water aqueduct system. This is accomplished by maintaining an accessible amount of stored water that could provide an uninterrupted supply of water to the City's water treatment facilities, should an interruption to the supply of imported water occur. The management of reservoirs is guided by Council Policy 400-04, which outlines the City's Emergency Water Storage Program. The policy mandates that the Department store sufficient water in active, available storage to meet six-tenths of the normal annual (7.2 months) City water demand requirements (conservation is not included). Active, available storage is that portion of the water that is above the lowest usable outlet of each reservoir.

The monthly emergency storage requirement changes from month-to-month, and is based on the upcoming seven months water demand. This results in a seasonally fluctuating emergency storage requirement, generally peaking in April and reaching its minimum in October. This seasonally fluctuating requirement makes a portion of the required emergency storage capacity available for impounding or seasonal storage.

The purpose of seasonal storage is to increase imported water supply. This is done by storing surplus imported water in the wet winter season for use during the dry summer season. This may also be accomplished by increased use of imported water in lieu of local water in the winter when local water may be saved in reservoirs or groundwater basins for summer use. In addition to increased water yield, this type of seasonal operation also reduces summer peaking on the imported water delivery system.

Conservation

The Department's Water Conservation Program is effective in promoting permanent water savings. Established by the City Council in 1985, the Water Conservation Program accounts for more than 35,650 acre-feet of potable water savings per year. This savings has been achieved by creating a water conservation ethic, adopting programs, policies and ordinances designed to promote water conservation practices, and implementing comprehensive public information and education campaigns.

The City offers a broad range of conservation methods to help meet the needs of our residential and commercial water customers. These include, but are not limited to, the following:

- Rebate programs for high efficiency toilets, washing machines and commercial water saving devices
- Rebates for replacing grass with sustainable landscapes and micro-irrigation systems
- Residential interior/exterior and commercial landscape survey programs
- Public education and outreach

Research conducted by the City, the Water Authority, and the Water Research Foundation has shown that more than half of residential water-use is outdoors. Therefore, the City has added outdoor conservation programs to focus on water efficient landscaping and irrigation management, which provide the best opportunity to achieve significant water savings.

Tools and services available for customers include:

- Commercial and Residential Water-Use Survey Programs — account for all water-use, determine leaks, and check irrigation systems for proper function and uniform coverage. Residential surveys average 15 percent water savings, while commercial surveys, depending on type of facility, can achieve 15 percent to 25 percent water savings. The current focus is on multi-family surveys.

- Nationally recognized Landscape Watering Calculator — an on-line tool that creates watering schedules based on landscaping features, soil type, and weather data. The Calculator is very popular [http://apps.sandiego.gov/landcalc/start.do] and those who have used it are impressed with its ease of use. MWD has adopted this tool and it is available throughout Southern California.

- Water Resources Landscape Database — another tool used to create water budgets and manage irrigation using aerial photographs, GIS maps, weather data, etc. This service has generated significant water savings in City parks, freeway landscapes, schools, and homeowner associations.

- New programs in place include incentives to install water efficient irrigation equipment and evapo-transpiration controllers (smart irrigation clocks that use weather data to set watering schedules); as well as incentives to replace grass with sustainable landscapes.

- The Water Conservation Section teamed up with the Transportation & Storm Water Department to include rain barrels as an item that can receive a rebate through the "Outdoor Water Conservation Rebate Program." Rain barrels are used to collect rainwater from hard surfaces such as household rooftops. When citizens install a rain barrel at their home, they are helping to maintain a healthy urban watershed by reducing the demand on the potable water system, while also reducing the amount of wet weather runoff that is collected and sent into the public storm water system.

- 'San Diego Municipal Code (SDMC) 67.06 Water Submeters' was adopted in April 2010, to encourage water conservation in multi-family residential and mixed-use buildings by requiring the use of water submeters for each individual residential unit. Billing individual residential units based on the actual amount of water consumed in the unit creates a financial incentive for residents of multi-family residential units to conserve water.

Planning efforts to increase water conservation is an ongoing process. The aforementioned water conservation programs undergo periodic reevaluation to ensure the realization of forecasted savings. Additionally, changes in water conservation technologies may require reassessment of long-range plans. The Department continues to work with proven water conservation programs, while including irrigation management programs to maximize water savings; regularly examines new technologies and annually checks progress towards conservation goals; and, continues to work collaboratively with MWD and the Water Authority to formulate new conservation initiatives. The City's water conservation report, prepared annually, is available at http://www.sandiego.gov/water/pdf/waterreuse/2013/fy13annualwater130101.pdf. The report provides an ongoing assessment and status update, redirecting or enhancing efforts as needed. The programs outlined in the document undergo periodic reevaluation to ensure the realization of forecasted savings.

Drought Management

On January 17, 2014, California Governor Jerry Brown declared a drought in California. On February 11, 2014, the Metropolitan Water District of Southern California's Board of Directors declared a Water Supply Alert throughout its 5,200-square-mile service area as part of a set of comprehensive actions to address the state's unprecedented dry conditions. Additionally, on February 13, 2014, the San Diego County Water Authority's Board of Directors unanimously called upon the region's residents, businesses and institutions to increase water conservation efforts in response to severe drought conditions across California. The Board also approved, notifying the Water Authority's 24-member agencies, including the City of San Diego, which is at the Level 1 Drought Watch of the Model Drought Response Ordinance.

The City has an extensive list of permanent water use restrictions that are outlined in San Diego Municipal Code Section §67.3803. These restrictions were updated several times during the last California drought. They are in effect every day in San Diego and include the following limitations:

a) no runoff/excessive irrigation;
b) repair leaks upon discovery or within seventy-two hours of notification;
c) no watering of paved areas;
d) no overfilling swimming pools and spas;
e) no non- recirculation decorative water fountains;
f) car washing only in a commercial car wash or using a hose with shutoff nozzle or a bucket;
g) new buildings must recycle cooling system water and car wash water;
h) restaurants will only serve and refill water upon request;
i) hotel guests must have the option of not laundering towels and linens daily;

j) no watering after 10 am and before 4 pm (winter)/before 6 pm (summer);

San Diego's permanent water use restrictions are typically similar to the restrictions many local water agencies implement when they invoke their Level 1 water restrictions.

The San Diego City Council invoked a "Drought Response Level 1 – Drought Watch Condition" on May 20, 2014, that went into effect on July 1, 2014. The Mayor subsequently recommended the City of San Diego invoke SDMC Section 67.3806 "Drought Response Level 2 – Drought Alert Condition." Under the Alert condition all previously listed voluntary conditions listed under Drought Watch become mandatory. Additional restrictions are summarized as follows:

1) Sprinklers limited to 10 minutes in warm months, 7 in cool months;
2) Watering without an irrigation system limited to 3 assigned days;
3) Stop operating ornamental fountains except for maintenance;
4) Potted plants and food plants must also be irrigated before 10 am and after 4 pm (winter)/after 6 pm (summer) on any day; and
5) Irrigation is allowed in certain extreme situations.

The San Diego City Council invoked a "Drought Response Level 2 – Drought Alert Condition" on October 20, 2014, that went into effect on November 1, 2014.

Recycled Water Supplies

In FY 2014, the beneficial reuse of the recycled water was 13,221 AF: 8,417 AF from the NCWRP and 4,804 AF from the SBWRP. Although landscape irrigation continues to be the leading use of the recycled water, the customer base has become more varied over the years with an increase in the number of industrial and dual plumbed meter connections.

Proactive marketing activities targeting existing irrigation customers, to encourage them to convert their cooling systems to recycled water, coupled with outreach efforts to connect new customers have been successful, as recycled water meter connections have increased over 41 percent since 2007. As of June 2014, the City provides recycled water service to 576 retail meters and 4-5 wholesale meter connections, including the City of Poway, Olivenhain Municipal Water District (3 connections) and Otay Water District. The 2013 top ten retail customers included the City of San Diego Park & Recreation Department, Miramar Marine Corps Air Station Miramar, Black Mountain Ranch and Santa Luz HOA, Caltrans, El Camino Memorial Park, U.S. International Boundary & Water Commission, The Irvine Company, Qualcomm, Village Nurseries (Miramar Nursery) and the City of San Diego's Miramar Landfill.

In FY 2014, financial incentives from the sale of recycled water resulted in nearly $3.2 million in savings towards imported water purchases. The financial incentives are a result of local water resources development agreements with Metropolitan Water District and the San Diego County Water Authority.

The Department, in cooperation with the Park & Recreation Department, has aggressively pursued the retrofitting of City parkland, street landscaping and open space to use recycled water for irrigation; sites fronting recycled water distribution pipelines were targeted. In 2007 only 23 recycled water meters were serving City sites; as of June 2014, that number has grown to 84 meter connections. The Departments are currently working on retrofitting four additional parks/open spaces. The irrigation retrofits are funded in part by Federal and State grants.

Public Utilities Department's Capital Improvement Program

The Department reevaluates the Water projects contained in the Capital Improvements Program (CIP) and the timing thereof periodically. Changes to the CIP are made to reflect changing priorities within the water system and occur as a result of project scope changes, date revisions, project sequencing, and operational considerations. The Department expended approximately $840 million from July 1, 2003, through June 30, 2013 on CIP projects. Improvements included projects to upgrade and expand water treatment plants, rehabilitate raw and treated water storage facilities, construct major transmission pipelines, replace and/or upgrade existing pump stations, replace cast iron water mains citywide, expand the recycled water system, and other new supply initiatives. In November 2013, the City Council adopted water rate increases of 7.25 percent beginning on January 1, 2014 and 7.5 percent beginning on January 1, 2015. These rate increases will provide needed revenue to fund the upgrade and expansion of the water system in order to ensure a reliable water supply for all City residents and meet Department of Public Health mandates.

In 2009, the Department initiated a facilities master plan to identify long-term facility needs. With the completion of the water master plan in 2011, over 80 projects were identified through the master planning effort for CIP implementation of fiscal years 2012-2032. Project scopes were developed from facility condition assessments and system evaluations. The prioritization of CIP projects are based on the adopted City Council Policy 800-14 (CP 800-14) as well as inputs from Independent Rates Oversight Committee members and operational staff. The list of prioritized projects will be the basis for 2012-2032 CIP program.

Summary of Supplies

Historic imported water deliveries from the Water Authority to the Public Utilities Department and local surface water, conservation savings and recycled water deliveries are shown in **Table 5-1.**

Table 5-1
Historic Imported, Local and Recycled Water Demands*
Public Utilities Department (Source: 2010 UWMP)

Fiscal Year	Imported Water (acre-feet)	Local Surface Water (acre-feet)	Conservation[1] (acre-feet)	Recycled Water (acre-feet)	Total[2] (acre-feet)
1990	233,158	22,500	-	-	255,658
1995	162,404	59,024	8,914	-	230,342
2000	207,874	39,098	17,410	3,250	267,632
2005	204,144	26,584	29,410	4,294	264,432
2010	188,337	13,117	34,317	12,173	247,944

Table 5-1 Notes:

[1]Conserved water results in savings and is not a direct supply.
[2]Total includes water supplied and conserved.
*Includes retail and wholesale demands

5.4.2 Plans for Acquiring Additional Supplies

Future Supplies

The Department completed the City Council approved 2012 Long-Range Water Resources Plan (2012 LRWRP) on December 10, 2013. The 2012 LRWRP is a high level strategy document that evaluates water supply and demand-side objectives against multiple planning objectives. The 2012 LRWRP was an open participatory – stakeholder driven process that evaluated over 20 water supply options such as water conservation, recycled water, groundwater storage, brackish groundwater desalination, rainwater harvesting, graywater and potable reuse. The plan takes a long-range viewpoint through the year 2035 in addressing risk and the uncertainty of future water supply conditions. It is a plan that sets the tone or direction of where the City places its efforts in developing local water supplies.

Conservation and water recycling programs have been implemented and are under investigation for ways to be expanded or increased. The Department is also investigating the development of groundwater and potable reuse.

Conservation

Like many agencies in California, the City is committed to reducing its per capita water consumption by at least 20 percent by the year 2020. Aside from the existing programs listed in Section 5.4.1 of this report, the City is also evaluating the following programs to help reduce overall water consumption:

- Water budget based billing for irrigation only customers - An effort is currently underway to evaluate billing irrigation customers based on their ability to meet property specific water use budgets, and implement a tier rate structure that encourages usage within water budgets.

- Conservation-oriented rate structures - The new rate structure, which took effect in January 2014, adds a fourth new tier for single-family residential customers that recognizes water conservation efforts, and increases the rates for higher tiers to discourage high volume usage.
- Automated Meter Interface - The City is starting to install smart water meters in monthly billed accounts. These meters allow remote access to consumption patterns via a web portal, and give water customers data that they can monitor and use to manage better their water consumption.

Recycled Water

Recycled Water Study:

The Recycled Water Study was presented to and unanimously accepted by the City Council on July 17, 2012, following a three-year effort that included extensive stakeholder involvement. The Study can be located at the following link:

http://www.sandiego.gov/water/pdf/waterreuse/2012/recycledfinaldraft120510.pdf.

During the 2008 to 2010 Point Loma Wastewater Treatment Plant (Point Loma) permit modification process, San Diego Coastkeeper and the San Diego Chapter of the Surfrider Foundation entered into a Cooperative agreement with the City to conduct the Recycled Water Study (Study). In accordance with the agreement, the San Diego Coastkeeper and the San Diego Chapter of the Surfrider Foundation did not oppose the United States Environmental Protection Agency's (USEPA) decision to grant the permit modification. The City Council authorized the execution of the Cooperative Agreement on February 18, 2009. The modified Permit allows Point Loma to continue operating as a chemically enhanced primary treatment facility (CEPT) for five years until July 31, 2015, when the permit must be renewed rather than upgrading the treatment system to meet secondary standards as required in the federal Clean Water Act. The Study concluded meeting all terms of the Agreement with Coastkeeper and Surfrider.

The Recycled Water Study identified five (5) Reuse Alternatives. Non-Potable Reuse, Indirect Potable Reuse, and wastewater off-load to the Point Loma are the common components of each of the five alternatives. All reuse alternatives presented in the study achieve the study goals, provide a bold vision for the future water reuse in the Metro Service Area, and provides potential savings to ratepayers. For additional details on the Reuse Alternatives, please see the Recycled Water Study Report Dated July 2012, in the above link.

Potable Reuse:

Potable Reuse is an approach the City is considering for maximizing the use of recycled water. Recycled water that is used for non-drinking uses like irrigation and industrial processes, would undergo advanced water purification (AWP) to render it safe for reuse as a drinking water supply. The AWP process uses multiple treatment barriers to remove contaminants from the water and prevent them from re-entering the water supply. It begins with membrane filtration, followed by reverse osmosis, and ends with advanced oxidation. The result is purified water that meets all drinking water standards and is similar in quality to distilled water.

There are two major types: Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). With IPR, the purified water is sent to an environmental buffer; for the City's IPR concept, San Vicente Reservoir would be the environmental buffer. The water in San Vicente is treated at a drinking water treatment plant before it is distributed for drinking purposes. Direct potable reuse differs in that there is no environmental buffer. The California Department of Public health is mandated to determine the feasibility of establishing DPR regulations. Industry experts expect that DPR regulatory criteria to include the use of additional treatment or engineered storage barriers to compensate for the absence of an environmental buffer. The City monitoring the development of DPR regulations and how they might influence the viability of potable reuse implementation.

Water Purification Demonstration Project:

In order to assess the feasibility of indirect potable reuse with reservoir augmentation (IPR/RA), the City initiated a Water Purification Demonstration Project (Demonstration Project). The Demonstration Project evaluated the feasibility of using advanced water purification (AWP) technology to produce water that can be sent to San Vicente Reservoir, subsequently treated, and later be distributed as potable water.

As part of the Demonstration Project, the City tested and operated a one-million gallon per day demonstration-scale AWP Facility from June 2011 to August 2012. The purified water was routinely tested to determine the effectiveness of the treatment equipment, and operating data was gathered to develop a cost estimate for full-scale facilities. A study of San Vicente Reservoir was also conducted to establish residence time and short circuiting conditions of the purified water in the reservoir. An extensive public outreach and education program was implemented to educate the public about the potential benefits and implications of an IPR/RA project. The City also coordinated with the State's regulatory agencies to help define the requirements for an IPR/RA project. The Final Project reports have been completed and are available at the following link: www.purewatersd.org/projectreports . The Demonstration Project reports were presented to full City Council on April 23, 2013. The City Council adopted the Demonstration Project Reports and directed staff to determine a preferred implementation plan and schedule that considers potable reuse options for maximizing local water supply and reduced flows to the Point Loma Wastewater Treatment Plant. This follow on effort, now known as the Pure Water San Diego Program, is described in more detail below.

Pure Water San Diego Program:

The Department's Pure Water San Diego Program (Program) is a 20-year program ending in year 2035. The program will create a safe and reliable local water supply through potable reuse, while reducing the Point Loma Wastewater Treatment Plant's ocean discharges and accomplishing secondary equivalency.

Potable Reuse is an approach the City is considering for maximizing the use of recycled water. Recycled water that is used for non-drinking uses like irrigation and industrial processes, would undergo advanced water purification (AWP) to render it safe for reuse as a drinking water supply. The AWP process uses multiple treatment barriers to remove contaminants from the water and prevent them from re-entering the water supply. It begins with membrane filtration, followed by reverse osmosis, and ends with advanced oxidation. The result is purified water that meets all drinking water standards and is similar in quality to distilled water.

There are two major types: Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). With IPR, the purified water is sent to an environmental buffer; for the City's IPR concept as studied in the Demonstration Project, San Vicente Reservoir would be the environmental buffer. The water in San Vicente is treated at a drinking water treatment plant before it is distributed for drinking purposes. Direct potable reuse differs in that there is no environmental buffer. The California Department of Public health is mandated to determine the feasibility of establishing DPR regulations. Industry experts expect that DPR regulatory criteria to include the use of additional treatment or engineered storage barriers to compensate for the absence of an environmental buffer. The City monitoring the development of DPR regulations and how they might influence the viability of potable reuse implementation.

For the Pure Water San Diego Program, Department staff have completed most of the technical studies to refine system-wide reuse concepts developed in the Recycled Water Study (July 2012), are developing a cost-sharing framework, serving on an advisory group to an Expert Panel on Direct Potable Reuse (DPR) and Recycled Water, and are continuing tours of the Advanced Water Purification Facility, speakers bureau presentations and community events participation.

In addition to the above, Department staff is engaged in the preparation of the National Pollution Discharge Elimination Permit (modified permit) for Point Loma which expires July 31, 2015. The draft modified permit application will be brought forward for City Council consideration in fall 2014. Staff is also developing a regulatory and legislative strategy related to Point Loma that will require City Council input and involvement.

The Department is working on implementing the various facets of the Pure Water San Diego Program. Implementation strategy tasks include facility sitting studies, engaging key regulatory agencies to develop a modified NPDES permit renewal application which secures long-term compliance with discharge standards at Point Loma through potable reuse and secondary equivalency, and establishing a financing plan and cost-sharing principles with other public agencies that use the City's wastewater system.

This comprehensive effort will provide a secure and reliable long-term local water supply for San Diego while resolving the decade's long issues associated with Point Loma.

Groundwater

There are several groundwater basins in the San Diego region that the City has rights, concerns jurisdiction or otherwise an interest in developing for municipal supply or other beneficial use. These basins are:

- San Pasqual Basin
- Mission Valley Basin
- Santee/El Monte
- Tijuana Basin
- San Diego Formation

The groundwater quality from these basins is predominantly brackish. Improved technologies provide consideration of affordable water sources, such as brackish groundwater, that were not available a few decades ago. Groundwater is a viable alternative and is part of the City's planning efforts. Local water supply projects, particularly groundwater exploration, benefit City rate payers, offer drought protection, and are locally controlled.

The San Diego City Council adopted the San Pasqual Groundwater Management Plan (GMP) in 2007. Several management actions outlined in the GMP are currently being implemented. For the next several years, basin activities such as surface water and groundwater monitoring programs, water quality testing, basin water budget, and basin capacity studies will be the focus for understanding, protecting and evaluating the long-term sustainable use of the San Pasqual Basin as a water supply source.

The City is the Monitoring Entity for the San Pasqual Basin as identified by the California Statewide Groundwater Elevation Monitoring (CASGEM) program. Working cooperatively with the California Department of Water Resources (DWR), the City established a network of monitoring wells for CASGEM to regularly and systematically track seasonal and long-term trends in groundwater elevations for this alluvial groundwater basin. Included in the monitoring network plan are three multi-level monitoring wells that were installed by the United States Geological Survey under a cooperative agreement with the City. Participation in the statewide CASGEM program allows basin groundwater data to be maintained and readily available through DWR's public data base. The City is reaching out to local agencies and pursuing a Voluntary Cooperative for monitoring entity status of the El Monte/Santee Basin which is located in the upper reach of the San Diego River.

On May 30, 2014, the City completed a Salinity and Nutrient Management Plan (SNMP) for the San Pasqual Basin in compliance with Recycled Water Policy 2009 that was adopted by State Water Resources Control Board (State Board). The City facilitated a stakeholder driven basin-wide approach to complete this effort. The framework for the SNMP incorporated components from the SNMP guidelines *(Salinity/Nutrient Management Planning in the San Diego Region (9), Welch 2010)* adopted by the State Board. The SNMP identified excessive levels of salts and nutrients in areas of the basin and provides Management strategies for protecting and improving groundwater quality for agriculture, potable water supply and for other beneficial groundwater uses.

The City has been investigating Mission Valley Aquifer. Mission Valley is a narrow, east-west trending valley carved out by the San Diego River as it drains westward from Mission Gorge to the Pacific Ocean. The most conducive portion of the aquifer lies within the extent of an historical well field where the City has retained ownership of the property and where a substantial portion is overlain by Qualcomm Stadium and its parking lot. Part of the history is the establishment of the City's pueblo water right, a prior and paramount right to all of the water of the San Diego River (surface and underground). In 1963 a fuel tank farm was built in Mission Valley at the mouth of Murphy Canyon, know as Mission Valley Terminal (MVT). Underground fuel contamination was suspected to being in 1986. From 1986 to 1991, approximately 200,000 gallons of gasoline was released underground from the MTV located upstream of Qualcomm Stadium and contaminated the aquifer. The contamination extended from the tank farm, beneath Qualcomm property, to approximately where Interstate 805 crosses the San Diego River. Although remediation of the Mission Valley Aquifer has been ongoing for a period of time, the City is waiting for remediation to be complete before resuming its plans for development of the aquifer for municipal supply.

The City has been producing groundwater from the Santee – El Monte basin from two municipal supply wells. One well is located just downstream of the San Vicente Reservoir and the other is located just downstream of the El Capitan Reservoir. The City is evaluating the expansion of its groundwater production facilities at each location to maximize yield. The City's existing San Vicente Production well was constructed in 2004 and pumps a maximum of 600 gallons per minute. The well conveys groundwater directly to the City's existing raw water line from the reservoir and ultimately to the City's Alvarado Treatment Plant. The well located just downstream of the El Capitan reservoir and installed in a granitic rock formation which extracts water from a fractured rock system at a yield of 50 gallons per minute. This well also conveys groundwater to a raw water pipeline coming from the dam to supply the Alvarado Treatment Plant.

The City desires to use the San Diego Formation for groundwater municipal supply and seeks to manage the safe yield of the aquifer system in a prudent and efficient manner. The City has been engaged in investigating to gain a better understanding of the San Diego Formation Basin for many years. The City has been better able to characterize the water quality and quantity in the San Diego Formation through aquifer testing and monitoring well installation that have occurred since 2007. In addition, the City has been working with the United States Geological Survey to develop an integrated and comprehensive understanding of the geology and hydrology of the San Diego Formation, and to use this understanding to evaluate a sustainable, long-term environmental sound use of the formation for municipal supply.

Section 6 - Projected Demands

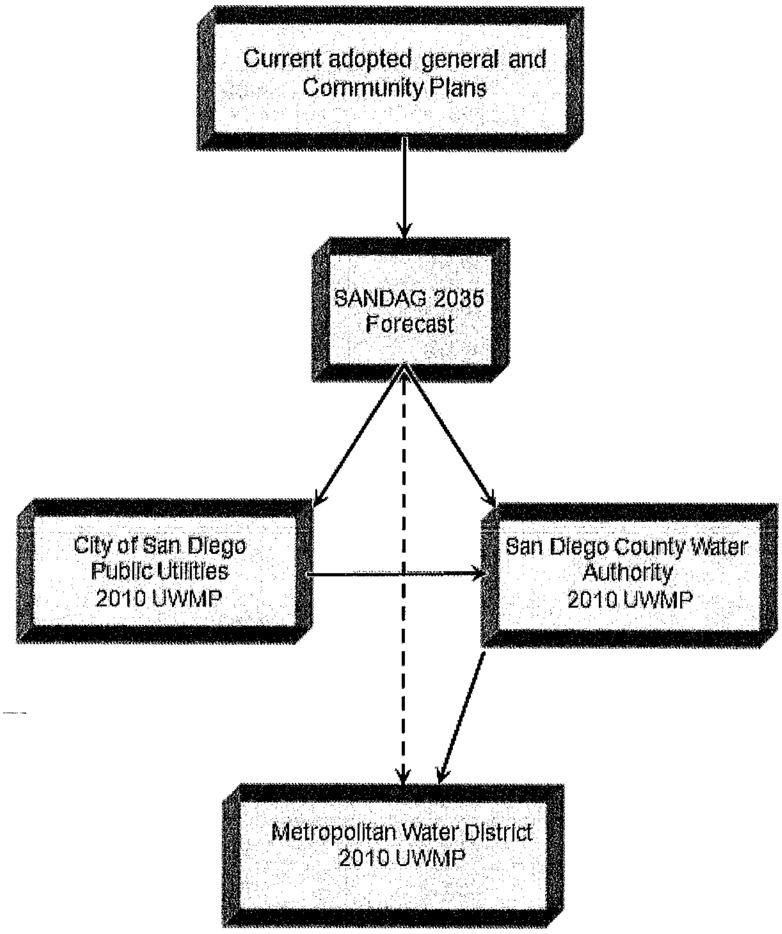
Approximately every three years the Public Utilities Department (Department) calculates projected water demands within its service area for planning purposes. A computer model is used (IWR-MAIN) to break down water-use by major water-use sectors: Commercial, Industrial, Residential and Public uses. Using past water-use data from the Department and demographic data provided by SANDAG land use, the model is able to correlate the data to determine sector water demands. Using this correlated data, future demographic data is used to project water demands. The model also accounts for water conservation, weather and water rate changes.

In addition to the Department, the Water Authority and MWD use regional growth forecasts to calculate projected water demands within their respective service areas. This provides for consistency between the retail and wholesale agencies projected water demands, thereby ensuring that adequate supplies are being planned for the Department's existing and future water users. The SANDAG forecasts are based on adopted community plan land use, but not citywide zoning. SANDAG forecasts the number of residents, dwelling units, and employees in an area, but not square footage, hotel rooms, or visitors (non-residents or non-employees). For urban areas the smallest forecast geography is typically at the block level, but for suburban and less developed areas the forecast geography can be larger. SANDAG typically updates the regional growth forecast every three to four years. The Department water demand projections, based on the SANDAG Series 12 Forecast land use, are incorporated in the City's 2010 UWMP. These projections are then forwarded to the Water Authority for use in the preparation of their UWMP, which is further incorporated into MWD's UWMP to calculate the ultimate water demands of the region (see **Figure 6-1**).

The Department updates its UWMP every five years. The 2010 UWMP, originally scheduled for completion in December 2010, was completed and adopted in June 2011. The time extension granted for the completion of the 2010 UWMP was due to the new SBX7-7 reporting requirement that needed to be incorporated into the 2010 UWMP. SBX7-7, which is part of the 2009 Water Legislation, requires urban water agencies to reduce statewide per capita water consumption 20 percent by 2020.

The Governor has recently signed Assembly Bill (AB) 2067 which amend the water code extending the deadline for submitting 2015 UWMP. The bill would require each urban water supplier to submit its 2015 UWMP to the Department of Water Resources by July 1, 2016.

FIGURE 6-1
WATER DEMAND PROJECTIONS



The demands from the 2010 UWMP are used throughout this Report. The historical and projected water demands for a normal year are shown in **Table 6-1**.

As part of the requirements for complying with SB 610, **Table 6-7** and **Table 6-8** show the single-dry year and consecutive multiple-dry year demands. All tables in this section are based on data from the 2010 UWMP.

TABLE 6-1
PAST, CURRENT, AND PROJECTED WATER DELIVERIES
(AFY)

Water Use Sector	2005				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	217,983	77,864	0	0	77,864
Multi-family	28,443	39,220	0	0	39,220
Commercial	14,468	33,099	0	0	33,099
Industrial	253	4,276	0	0	4,276
Institutional/Governmental	2,341	16,842	0	0	16,842
Landscape Irrigation	7,245	27,877	0	0	27,877
Total	270,733	199,178	0	0	199,178

Source: City of San Diego Public Utilities Report U02-P10715.

Water Use Sector	2010				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	220,862	62,367	0	0	62,367
Multi-family	28,361	36,324	0	0	36,324
Commercial	14,542	27,244	0	0	27,244
Industrial	186	2,325	0	0	2,325
Institutional/Governmental	2,321	13,774	0	0	13,774
Landscape Irrigation	7,327	20,257	0	0	20,257
Total	273,599	162,291	0	0	162,291

Source: City of San Diego Public Utilities Report U02-P100715.

Table 6-1, Continued

Water Use Sector	2015				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	231,346	75,922	0	0	75,922
Multi-family	32,082	47,266	0	0	47,266
Commercial	14,376	31,617	0	0	31,617
Industrial	186	2,071	0	0	2,071
Institutional/Governmental	2,302	13,359	0	0	13,359
Landscape Irrigation	7,583	25,452	0	0	25,452
Total	287,587	195,688	0	0	195,688

Water Use Sector	2020				
	Metered		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single-family	236,639	79,992	0	0	79,992
Multi-family	37,330	56,700	0	0	56,700
Commercial	14,783	33,541	0	0	33,541
Industrial	186	2157	0	0	2157
Institutional/Governmental	2,302	13,772	0	0	13,772
Landscape Irrigation	7,869	27,247	0	0	27,247
Total	298,582	213,409	0	0	213,409

Water Use Sector	2025		2030		2035	
	Metered		Metered		Metered	
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)
Single-family	241,491	83,370	244,138	85,633	245,682	86,471
Multi-family	42,662	66,070	47,910	75,328	52,420	82,781
Commercial	14,681	34,012	14,100	33,116	13,853	32,740
Industrial	176	2,077	166	1,995	166	1,967
Institutional/Governmental	2,247	13,639	2,172	13,399	2,154	13,329
Landscape irrigation	8,192	28,893	8,162	29,301	8,543	30,698
Total	308,505	228,061	315,534	238,772	321,337	247,986

Table 6-2 summarizes the current and planned water sources the City is relying on to meet future demands.

TABLE 6-2
PLANNED WATER SUPPLY SOURCES
(AFY)

Water Supply Sources	Wholesaler Supplied Volume (yes/no)	2015	2020	2025	2030	2035
San Diego County Water Authority	Yes	201,719	221,458	237,622	249,728	260,107
Supplier produced surface water [(a)]		29,000	29,000	29,000	29,000	29,000
Supplier produced groundwater		500	500	500	500	500
Transfers In		0	0	0	0	0
Exchanges In		0	0	0	0	0
Recycled Water [(b)]		9,253	9,253	9,253	9,253	9,253
Desalinated Water		0	0	0	0	0
Other		0	0	0	0	0
Total		240,472	260,211	276,375	288,481	298,860

Notes:

[(a)] *Local surface water estimates provided by City, 2011.*

[(b)] *Recycled water excludes recycled water sold to other agencies and is from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.*

6.1 Water Sales to Other Agencies

Potable Water

The City, through past agreements, sells treated water to the California American Water Company (Cal-Am) which provides water service to the cities of Coronado and Imperial Beach, and Naval Air Station North Island. The population of Naval Station North Island is located within the City of Coronado, whereas the other military bases that the City serves are within the City. The City also sells untreated water to Santa Fe Irrigation District and San Dieguito Water District. **Table 6-3** presents the water sales to other agencies.

Per the agreement between the City and Cal-Am, only local surface water is sold to Cal-Am to provide water to supply Cal-Am customers. A portion of City residents in the South Bay area are also served by Cal-Am and can be served by imported water as well. Per the agreement between the City and the City of Del Mar, the City takes deliveries of water, which the City of Del Mar purchases from the Water Authority, through the Second Aqueduct Connection at Miramar. This water is then treated at the City's Miramar WTP and transported to the City of Del Mar through several interconnections.

The City has agreements to provide surplus treated water to Otay Water District and untreated exchange water to Ramona Municipal Water District. These water deliveries occur infrequently and for short periods of time, and are therefore not shown in **Table 6-3**.

TABLE 6-3
SALES TO OTHER AGENCIES-POTABLE
(AFY)

Water Distributed	2005	2010	2015	2020	2025	2030	2035
California American Water Company	13,311	11,462	13,153	13,395	13,452	13,757	13,988
Santa Fe Irrigation District and San Dieguito Water District [(a)]	2,012	7,227	7,596	7,983	8,391	8,819	9,268
City of Del Mar [(b)]	1,324	1,058	1,112	1,168	1,228	1,290	1,356
Naval Air Station North Island	1,204	1,568	1,568	1,568	1,568	1,568	1,568
Total	14,515	13,030	14,721	14,963	15,020	15,325	15,556

Notes:

[(a)] Through a joint agreement, the City supplies raw water from local surface water supplies to Santa Fe Irrigation District/San Dieguito Water District, and treated water to the other agencies. This water supply is not included in total since the supply is not included in the local surface water supply.

[(b)] City of Del Mar not included in total as the City is treating water for Del Mar that is provided by Water Authority.

Recycled and Non-Revenue Water

The City has three separate agreements to sell recycled water. Olivenhain Municipal Water District and the City of Poway are provided recycled water from the City's North City Water Reclamation Plant while Otay Water District receives recycled water from the City's South Bay Water Reclamation Plant.

Non-Revenue Water (NRW) is water that is unaccounted for or unbilled water consumption. Unaccounted for water can be attributed to unauthorized consumption, meter inaccuracies, data errors, leakage on mains, leakage and overflow at storage and leakage at service connections. Using metered demand and total City delivered values, NRW was computed as 8.2 percent in 2012. Water use for firefighting, line flushing and other authorized, but unbilled use is classified in the computation of NRW as unbilled consumption.

City staff deemed it reasonable to assume this percent system loss could be maintained in future years given the City's aggressive program of leak detection and repair. The City is going forward with an automated meter reading system that could improve billing accuracy, better quantify real versus apparent losses and identify customer leaks. Thus, NRW is held constant in the projections at 9.0 percent for forecast years. **Table 6-4** represents the City's additional water uses (recycled water) and NRW.

TABLE 6-4
ADDITIONAL WATER USES AND LOSSES
(AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled water	4,294	7,656	9,253	9,253	9,253	9,253	9,253
Non-revenue water	10,404	21,909	20,810	22,586	24,041	25,131	26,065
Total	14,698	29,565	30,063	31,839	33,294	34,384	35,318

Notes:

1. *Source for recycled water: 2005 from Table 2-8 of the City's 2005 Urban Water Management Plan. 2010 from NCWRP and SBWRP beneficial reuse summary tables with wholesale deliveries excluded provided by the City on March 2, 2011. 2015 and later from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.*
2. *Recycled water is City use only and excludes recycled water sold to other agencies.*
3. *Source for non-revenue water: For 2005, Table 2-8 of the City's 2005 Urban Water Management Plan with 4.3% assumption. For 2010 to 2035, City of San Diego Public Utilities, Update of Long-Term Water Demand Forecast, Table 6-5, Water Demand Forecast with Normal Weather, June 2010.*

Table 6-5 is a summary of and displays City's past water use from 2005 and 2010 with projected water use shown for 2015 thru 2035.

TABLE 6-5
TOTAL WATER-USE
(AFY)

Water Distributed	Total Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (Table 6-1)	199,178	162,291	195,688	213,409	228,061	238,772	247,986
Sales to Other Water Agencies (Table 6-3)	14,515	13,030	14,721	14,963	15,020	15,325	15,556
Additional Water Uses and Losses (Table 6-4)	14,698	29,565	30,063	31,839	33,294	34,384	35,318
Total	228,391	204,886	240,472	260,211	276,375	288,481	298,860

The analysis in **Table 6-6** below compares the projected normal water supply and customer demands from 2010 to 2035, in five-year increments.

TABLE 6-6
PROJECTED NORMAL SUPPLY AND DEMAND COMPARISON
(AFY)

	2015	2020	2025	2030	2035
Supply totals	240,472	260,211	276,375	288,481	298,860
Demand totals	240,472	260,211	276,375	288,481	298,860
Difference (supply minus demand)	0	0	0	0	0

6.2 Projected Single-dry Year Water Supply and Demand

Table 6-7 provides a comparison of a single-dry year water supply with projected total water use over the next 25 years, in five-year increments. The City's demands in single-dry years are projected to be higher similar in proportion to the increase in regional water demands projected in the Water Authority's 2010 UWMP. An increase in use for landscape irrigation accounts for most of the increase in demands. It is assumed that recycled water demands would not increase in single-dry years. The wholesale water supplies from the Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies.

TABLE 6-7
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON
(AFY)

	2015	2020	2025	2030	2035
Supply totals	255,040	276,526	293,895	307,230	318,586
Demand totals	255,040	276,526	293,895	307,230	318,586
Difference (supply minus demand)	0	0	0	0	0

6.3 Projected Multiple-dry Year Water Supply and Demand

Table 6-8 compares the total water supply available in multiple-dry water years with projected total water use over the next 25 years. The City's demands in multiple-dry years are projected to be higher, similar in proportion to the increase in regional water demands projected in Water Authority's 2010 UWMP. It is presumed that recycled water demands would not increase in multiple-dry years. The wholesale water supplies from Water Authority are assumed to increase to meet the difference between the City's increased water demands and reduced local water supplies. Multiple-dry year scenarios represent hot, dry weather periods which may generate urban water demands that are greater than normal.

No extraordinary conservation measures are reflected in the demand projections. The recycled water supplies are assumed to experience no reduction in a dry year.

TABLE 6-8
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2035

(AFY)

		Supply and Demand Comparison – Multiple-dry Year Events				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	257,587	278,451	296,319	309,230	320,382
	Demand totals	257,587	278,451	296,319	309,230	320,382
	Difference	0	0	0	0	0
Multiple-dry year Second year supply	Supply totals	267,323	288,723	306,726	320,467	332,038
	Demand totals	267,323	288,723	306,726	320,467	332,038
	Difference	0	0	0	0	0
Multiple-dry year Third year supply	Supply totals	281,466	303,004	322,166	334,720	346,823
	Demand totals	281,466	303,004	322,166	334,720	346,823
	Difference	0	0	0	0	0

Section 7 - Conclusion - Availability of Sufficient Supplies

The Project is consistent with water demand assumptions in the regional water resource planning documents of the City, the Water Authority and MWD. The Public Utilities Department receives the majority of its water supply from MWD through the Water Authority. In addition, MWD and the Water Authority have developed water supply plans to improve reliability and reduce dependence upon existing imported supplies. MWD's Regional Urban Water Management Plan and Integrated Resources Plan, the Water Authority's 2010 UWMP and annual water supply report include projects that meet long-term supply needs through securing water from the State Water Project, Colorado River, local water supply development and recycled water.

The forecasted normal year water demands compared with projected supplies for the Public Utilities Department are shown in **Table 7-1**. This demonstrates that with existing supplies and implementation of the projects discussed in the three agencies' planning documents there will be adequate water supplies to serve all anticipated growth (existing and future planned uses) and development.

TABLE 7-1
PROJECTED SUPPLY AND DEMAND COMPARISON – NORMAL YEAR
(AFY)

	2015	2020	2025	2030	2035
Supply totals	240,472	260,211	276,375	288,481	298,860
Demand totals	240,472	260,211	276,375	288,481	298,860
Difference (supply minus demand)	0	0	0	0	0

Table 7-2 provides a comparison of a single-dry year water supply with projected total water use over the next 25 years, in five-year increments.

TABLE 7-2
PROJECTED SINGLE-DRY YEAR SUPPLY AND DEMAND COMPARISON
(AFY)

	2015	2020	2025	2030	2035
Supply totals	255,040	276,526	293,895	307,230	318,586
Demand totals	255,040	276,526	293,895	307,230	318,586
Difference (supply minus demand)	0	0	0	0	0

The multiple-dry year scenarios, within a 20-year projection, are shown in **Table 7-3**. This demonstrates that supplies will be adequate to meet all anticipated growth (existing and future planned uses) and development in multiple-dry year periods.

TABLE 7-3
PROJECTED SUPPLY AND DEMAND COMPARISON DURING MULTIPLE DRY YEAR PERIOD ENDING IN 2035

(AFY)

		Supply and Demand Comparison - Multiple-dry Year Events				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	257,587	278,451	296,319	309,230	320,382
	Demand totals	257,587	278,451	296,319	309,230	320,382
	Difference	0	0	0	0	0
Multiple-dry year Second year supply	Supply totals	267,323	288,723	306,726	320,467	332,038
	Demand totals	267,323	288,723	306,726	320,467	332,038
	Difference	0	0	0	0	0
Multiple-dry year Third year supply	Supply totals	281,466	303,004	322,166	334,720	346,823
	Demand totals	281,466	303,004	322,166	334,720	346,823
	Difference	0	0	0	0	0

This Report demonstrates that there are sufficient water supplies over a 20-year planning horizon to meet the projected demands of the Project as well as the existing and other planned development projects within the Public Utilities Department service area in normal, dry year, and multiple-dry year forecasts. This Project is proposing water demands which are included in the regional water resource planning documents of the City, the Water Authority, and MWD.

Source Documents

California Department of Water Resources (DWR), Progress on Incorporating Climate Change into Management of California's Water Resources, July 2006 Report
California Climate Change Center, 2006 Biennial Report: Our Changing Climate: Assessing the Risks to California, 2006
California Department of Water Resources Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001, March 2011
DSD Memorandum - Request for assessment and project description, February 2013
MWD 2010 Regional Urban Water Management Plan
MWD Report on Metropolitan's Water Supplies, A Blueprint for Water Reliability, March 2003
MWD Integrated Resources Plan Update, Oct 2010
Public Utilities Department 2010 Urban Water Management Plan
Public Utilities Department Annual 2012 Water Conservation Report
Public Utilities Department Recycled Water Study July 2012
Public Utilities Department Recycled Water Master Plan August 2011
Public Utilities Department Water Purification Demonstration Project Report
Water Authority 2010 Urban Water Management Plan
Water Authority Regional Water Facilities Master Plan, 2003
Water Department Long-Range Water Resources Plan (2002-2030), December 2002
Water Department The City of San Diego Subordinated Water Revenue Bonds, Series 2002, October 2002

Kaziha, Anas

To: Adrian, George
Subject: RE: Merge 56 WSA - AFG request to SDCWA

From: "Weinberg, Ken" <KWeinberg@sdcwa.org>
Date: Tue, Dec 9, 2014 4:39 pm
Subject: Merge 56 WSA - AFG request to SDCWA
To: "Steirer, Marsi" <MSteirer@sandiego.gov>, "Adrian, George" <GAdrian@sandiego.gov>
Cc: "Friehauf, Dana" <DFriehauf@sdcwa.org>

Dear Marsi,

Thank you for your email regarding the Merge 56 Development Project. The following is the Water Authority's response to your request to use the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with the proposed project.

The purpose of the AFG component of the demand forecast is to estimate, on a regional basis, additional demand associated with proposed projects not yet included in local jurisdictions' general plans and to plan for sufficient regional supplies to reliably meet the water demand of those projects. The Merge 56 Development Project identified in your e-mail, meets the criteria for the AFG component of the Water Authority's 2010 UWMP and we are planning to have water supplies to reliably meet the demand associated with the project. Our accounting of the AFG demand component will be adjusted to reflect the additional demand associated with the proposed project.

Please let me know if you have any questions or want to discuss further.

Ken

Ken Weinberg
Director of Water Resources

From: Steirer, Marsi [mailto:MSteirer@sandiego.gov]
Sent: Tuesday, December 02, 2014 5:25 PM
To: Weinberg, Ken; Friehauf, Dana; Bombardier, Tim
Cc: Adrian, George; Steirer, Marsi; Bista, Seevani; Kaziha, Anas
Subject: Merge 56 WSA - AFG request to SDCWA

Dear Ken:

The City of San Diego is preparing a water supply assessment for the Merge 56 Development Project, in accordance with the requirements of SB 610. The Project is situated in the communities of Torrey Highland and Rancho Peñasquitos, immediately adjacent to the State Route 56 (SR-56) right-of-way. The property consists of 41.34 acres of undeveloped land in the north-central portion of the City of San Diego. Regional access to the site is from SR-56, Interstate 5 (I-5) and Interstate 15(I-15). The Merge 56 Development Project involves a Community Plan Amendment (CPA) to amend the site's land use designation in the Torrey Highlands Subarea Plan from Commercial Regional (CR) and Medium High Density Residential (MHD) to Local Mixed Use (LMXU) South to allow for a mix of commercial, professional, corporate, scientific/medical office, hotel uses, as well as varying residential land uses. The proposed project would allow for the mixed-use development as listed below:

- 84 Single-family residence
- 158 Multi-family residential units
- 296,263 square feet of office space
- 9,000 square feet of commercial space
- 39,262 square feet retail space
- A cinema with 1800 seats
- A hotel with 120 rooms
- 29,573 square feet of grocery stores
- 21,885 square foot for fitness center
- 10,564 square feet of market hall space
- 15,000 square feet for drug store

As some of the proposed development for this project was not accounted for in the SANDAG Series 12 forecast, the water demand associated with the unaccounted growth was also not included in the City's 2010 Urban Water Management Plan. The unaccounted water demand associated with this project is **72 acre-feet per year** as seen in the table below:

Merge 56 Development Project Not Accounted for in the SANDAG's Series 12 Forecast

	Water Demands (Acre Feet per Year)		
Project	**Planned**	**Projected**	**Delta**
Merge 56 Development	107 AFY	179 AFY	- 72
Total			**- 72**

The City is requesting the use of the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with this project, similar to the other projects requested.

Attached are a vicinity map for the project and a spreadsheet showing the total AFG that the City has requested to date.

Your assistance with this request will be greatly appreciated.

Thank you,

Marsi

Marsi A. Steirer
Deputy Director
Public Utilities Department
(o) 619.533.4112
(m) 619.865.7458
msteirer@sandiego.gov

THE CITY OF SAN DIEGO

MEMORANDUM

DATE: March 23, 2015

TO: Elizabeth Shearer-Nguyen, Senior Planner, Development Services Department

FROM: Marsi A. Steirer, Deputy Director, Long-Range Planning and Water Resources Division

SUBJECT: Addendum to Approved Merge 56 Development's Water Supply Assessment Report for Inclusion of Additional Information on Accelerated Forecasted Growth

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The City of San Diego (City) Development Services Department (DSD), as a lead agency, requested the Public Utilities Department (Department) prepare a Water Supply Assessment (WSA) for Merge 56 Development project as part of the environmental review. The Department completed, approved and submitted the WSA to DSD on December 8, 2014. The project's WSA report was prepared in compliance with the requirements of Senate Bill (SB) 610 as codified in Water Code Section 10912(a) using the City's and San Diego County Water Authority's (Water Authority) 2010 Urban Water Management Plans (UWMP).

The water demands for the project (72 acre-feet per year) are accounted for in the Water Authority's 2010 UWMP under the Accelerated Forecasted Growth (AFG) demand increment. An approval letter from the Water Authority granting the AFG demand for the project is shown in Attachment A. The Water Authority's accounting of the AFG demands is adjusted to reflect the additional water demands associated with each member agency AFG request after the Department approves the WSA. All requests to date that have been received and granted by the Water Authority are shown in Attachment B.

Should you have any questions, please feel free to contact George Adrian at gadrian@sandiego.gov, 619-533-4680 or Seevani Bista at sbista@sandiego.gov, 619-533-4222.

Marsi Steirer

Marsi A. Steirer
Deputy Director

Sb/sb

Attachments: A- Approval Email from Water Authority
B - Water Authority's Accelerated Forecasted Growth Demands that have been Received and Granted

ATTACHMENT A

Approval Email from Water Authority

From: "Weinberg, Ken" <KWeinberg@sdcwa.org>
Date: Tue, Dec 9, 2014 4:39 pm
Subject: Merge 56 WSA - AFG request to SDCWA
To: "Steirer, Marsi" <MSteirer@sandiego.gov>, "Adrian, George" <GAdrian@sandiego.gov>
Cc: "Friehauf, Dana" <DFriehauf@sdcwa.org>

Dear Marsi,

Thank you for your email regarding the Merge 56 Development Project. The following is the Water Authority's response to your request to use the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with the proposed project.

The purpose of the AFG component of the demand forecast is to estimate, on a regional basis, additional demand associated with proposed projects not yet included in local jurisdictions' general plans and to plan for sufficient regional supplies to reliably meet the water demand of those projects. The Merge 56 Development Project identified in your e-mail, meets the criteria for the AFG component of the Water Authority's 2010 UWMP and we are planning to have water supplies to reliably meet the demand associated with the project. Our accounting of the AFG demand component will be adjusted to reflect the additional demand associated with the proposed project.

Please let me know if you have any questions or want to discuss further.

Ken

Ken Weinberg
Director of Water Resources

From: Steirer, Marsi [mailto:MSteirer@sandiego.gov]
Sent: Tuesday, December 02, 2014 5:25 PM
To: Weinberg, Ken; Friehauf, Dana; Bombardier, Tim
Cc: Adrian, George; Steirer, Marsi; Bista, Seevani; Kaziha, Anas
Subject: Merge 56 WSA - AFG request to SDCWA

Dear Ken:

The City of San Diego is preparing a water supply assessment for the Merge 56 Development Project, in accordance with the requirements of SB 610. The Project is situated in the communities of Torrey Highland and Rancho Peñasquitos, immediately adjacent to the State Route 56 (SR-56) right-of-way. The property consists of 41.34 acres of undeveloped land in the north-central portion of the City of San Diego. Regional access to the site is from SR-56, Interstate 5 (I-5) and Interstate 15(I-15). The Merge 56 Development Project involves a Community Plan Amendment (CPA) to amend the site's land use designation in the Torrey Highlands Subarea Plan from Commercial Regional (CR) and Medium High Density Residential (MHD) to Local Mixed Use (LMXU) South to allow for a mix of commercial, professional, corporate, scientific/medical office, hotel uses, as well as varying residential land uses. The proposed project would allow for the mixed-use development as listed below:

- 84 Single-family residence
- 158 Multi-family residential units
- 296,263 square feet of office space
- 9,000 square feet of commercial space
- 39,262 square feet retail space
- A cinema with 1800 seats
- A hotel with 120 rooms
- 29,573 square feet of grocery stores
- 21,885 square foot for fitness center
- 10,564 square feet of market hall space
- 15,000 square feet for drug store

As some of the proposed development for this project was not accounted for in the SANDAG Series 12 forecast, the water demand associated with the unaccounted growth was also not included in the City's 2010 Urban Water Management Plan. The unaccounted water demand associated with this project is **72 acre-feet per year** as seen in the table below:

Merge 56 Development Project Not Accounted for in the SANDAG's Series 12 Forecast			
	Water Demands (Acre Feet per Year)		
Project	Planned	Projected	Delta
Merge 56 Development	107 AFY	179 AFY	- 72
Total			- 72

The City is requesting the use of the Accelerated Forecasted Growth (AFG) component of the Water Authority's 2010 Urban Water Management Plan to meet the unanticipated water demands associated with this project, similar to the other projects requested.

Attached are a vicinity map for the project and a spreadsheet showing the total AFG that the City has requested to date.

Your assistance with this request will be greatly appreciated.

Thank you,

Marsi

Marsi A. Steirer
Deputy Director
Public Utilities Department
(o) 619.533.4112
(m) 619.865.7458
msteirer@sandiego.gov

ATTACHMENT B

Water Authority's Accelerated Forecasted Growth Demands that have been Received and Granted

2010 UWMP Accelerated Forecast Growth

				Running Total (AF)	Date Certified EIR Received
Response Date	**Agency**	**Project**	**Estimated (AF)**		
8/24/2011	City of San Diego	San Diego Corporate Center	147		
8/24/2011	City of San Diego	Metropolitan Airpark/Brown Field	38		
8/24/2011	City of San Diego	Barrio Logan Community Plan	272		
8/24/2011	City of San Diego	Otay Mesa Community Plan	170		
8/24/2011	City of San Diego	15th and Island	85		4/24/12 (Approved by CC)
9/26/2011	City of San Diego	Convention Center Expansion	**109**	**821**	9/19/12 (Approved by Port District)
1/31/2012	City of San Diego	WaterMark	**9**	**830**	
4/11/2012	City of San Diego	11th & Broadway Mixed-Use Project	**29**	**859**	12/4/12 (Phase 1 approved) Phase 2
2/13/2013	City of San Diego	Liberty Station East Hotel	**94**	**953**	6/4/13 (Approved by CC)
4/2/2013	City of San Diego	Cisterra Tower Development	**63**	**1,016**	
4/2/2013	City of San Diego	Kaiser Permanente Hospital	**227**	**1,243**	
5/29/2013	Otay Water District	Otay Ranch Planning Area 12	**127**	**1,370**	
7/9/2013	Otay Water District	Villages 3, 8east, and 10	**41**	**1,411**	
8/13/2013	Otay Water District	Village 2 (SPA Amendment)	**529**	**1,940**	
2/28/2013	City of San Diego	Chollas Triangle Development	**14.7**	**1,955**	
6/5/2014	City of San Diego	Glen at Scripps Ranch	**88**	**2,043**	
10/1/2014	City of San Diego	Encanto Community Plan Update	**1460**	**3,503**	
10/6/2014	City of San Diego	Ballpark Village Parcel C Reisdences	**170**	**3,673**	
12/8/2014	City of San Diego	Merge 56 Development	**72**	**3,745**	
			Running Total	**3,745**	
		Total City Usage	**3,048**		

Note: Data as of March 20, 2015

APPENDIX J

Waste Management Plan

WASTE MANAGEMENT PLAN

FOR

MERGE 56

~~JULY~~ OCTOBER 2014

Prepared for:
Merge 56 (by Sea Breeze Properties, LLC.)

Prepared by:

LATITUDE 33
PLANNING & ENGINEERING

Phone: (858) 751-0633 Fax: (858) 751-0634
9968 Hibert Street, 2nd Floor San Diego, CA 92131

Contents

LIST OF ATTACHMENTS

1.0 PURPOSE

According to the City of San Diego, Development Services Department, California Environmental Quality Act (CEQA) Significance Determination Thresholds (January 2011), projects that include the demolition, construction, and/or renovation of 1,000,000 square feet or more of building space generates 1,500 tons of waste or more. This amount of waste is further identified as a potentially direct significant impact. Direct impacts are mitigated by the implementation of a project-specific Waste Management Plan which reduces solid waste impacts to below a level of significance. The purpose of this Waste Management Plan (WMP), for the Merge 56 Project, is to identify waste that will be generated by the project during Site Development, Demolition/Construction, and Occupancy and to identify measures to reduce the waste.

The following regulations apply to Site Development, Demolition/Construction phase and all the way to Occupancy to assure waste is being diverted from landfills. On December 9, 1997, the City of San Diego adopted Section 142.08 of the San Diego Municipal Code, Refuse and Recyclable Materials Storage Regulations (Appendix 2). The ordinance requires the diversion of recyclable materials from landfill disposal to conserve the capacity and extend the useful life of the Miramar landfill, and reduce greenhouse gas emissions. Section 142.08 provides for permanent, adequate, and convenient space for the storage and collection of refuse and recyclable material to encourage recycling of solid waste. On November 13, 2007, the City of San Diego adopted a Recycling Ordinance. The ordinance requires recycling of plastic and glass bottles and jars, paper, newspaper, metal containers and cardboard at private residences, commercial buildings, and at special events requiring a City permit.

Effective January of 2008, the City of San Diego adopted a Construction and Demolition (C&D) Debris Diversion Deposit Ordinance. The ordinance requires that the majority of construction, demolition, and remodeling projects requiring building, combination, and demolition permits pay a refundable C&D Debris Recycling Deposit and divert at least 50% of their debris by recycling, reusing or donating usable materials. The C&D ordinance has a provision that would require 75% of construction and demolition waste be diverted once a certified facility within San Diego reaches a 75% diversion rate within 25 miles of 202 “C” Street. The ordinance is designed to keep C&D materials out of local landfills and ensure they get recycled. In 2011, California legislation increased the 50% waste reduction target established through Assembly Bill 989 to 75% through Assembly Bill 341.

2.0 PROJECT DESCRIPTION

The overall Merge 56 project is located south of State Route 56 and east of the future extension of Camino Del Sur in the city of San Diego. See Figure 1. The Merge 56 site is currently undeveloped. The project ultimately proposes to connect the northerly segment of Camino Del Sur from Torrey Santa Fe Road to the southerly segment near Dormouse Road. The project will also extend Carmel Mountain Road southwesterly to the proposed Camino Del Sur extension. Finally, the project will create mixed-use development (commercial, single family residential, and multi-family residential) north of the future intersection of Camino Del Sur and Carmel Mountain Road

The proposed project includes 242 dwelling units, 525,000 square feet of commercial and retail area. The residential and commercial areas will be receiving City services. The site has not been graded and is currently vacant.

3.0 PRECONSTRUCTION

Merge 56, by Sea Breeze Properties (Merge 56,) will assign a Solid Waste Management Coordinator (SWMC) for the Merge 56 project. The SWMC will have the authority to provide guidelines and procedures for contractor(s) and staff to implement waste reduction and recycling efforts. These responsibilities are, but not limited to, the following:

1. Review and understand the Waste Management Plan including responsibilities of SWMC.
2. Work with contractor(s) to estimate quantities of each type of material that will be salvaged, recycled, or disposed of as waste, then assist contractor(s) with documentation.
3. Review and update procedures as needed for material separation and verify availability of containers and bins needed to avoid delays.
4. Review and update procedures for periodic solid waste collection and transportation to recycling and disposal facilities.
5. Review and update solid waste management requirements for each trade.
6. Possess the Authority to issue Stop Work orders if proper procedures are not being followed.

From preconstruction to occupancy of the Merge 56 project, the WMP will provide contractors and homeowners' guidelines to ensure the proper reduction, segregation, recycling, and disposal of demolition, construction, and on-going operational waste. Proper segregation of recyclable materials is required based on type of materials generated and the availability of recycling facilities able to accept those materials. This responsibility will be under the direction of the assigned Merge 56 SWMC.

The Merge 56 SWMC will coordinate with ESD and/or Mitigation Monitoring staff, including regular communication and invitations to the work site. An invitation shall be extended to an ESD representative at least 7 days prior to attend each pre-construction meeting of each phase of the development.

VICINITY MAP

FIGURE 1

4.0 DEMOLITION AND CONSTRUCTION WASTE

In order to mitigate for any solid waste impacts identified for the Merge 56 project, offsite waste disposal shall target a minimum of 75% of all Construction, Demolition, and Land-Clearing waste to be diverted by weight from landfills.

Contractor Requirements. Sea Breeze Properties shall provide specific contract language for the Merge 56 project to implement this Waste Management Plan. The contract language will be made available to City personnel for verification. Contract language will require that:

- Specified demolition and construction materials will be reused or recycled onsite; others will be segregated for transport to specified recycling facilities.
- The contractor hired must determine the necessary capacity of dumpsters for each material type prior to obtaining the first demolition permit.
- The contractor(s) will be required to perform daily inspections of the demolition/construction site to ensure compliance with the requirements of the WMP and all other applicable laws and ordinances and report directly to the Merge 56 SWMC.
- Daily inspections will include verifying the availability and number of dumpsters based on amount of debris being generated, assuring correct labeling of dumpsters, proper sorting and segregation of materials.
- No more than 10% by volume of contamination may occur in each dumpster.
- The contractors and subcontractors will coordinate and work closely with the SWMC to minimize the over-purchasing of construction materials to lower the amount of materials taken to recycling and disposal facilities. Ways in which the project will minimize over-purchasing is to purchase pre-cut materials, work closely amongst designers, contractors, and suppliers.

Salvage. There are no existing building materials to be salvaged at this site.

Segregation of Demolition Debris for Recycling. The project does not anticipate any demolition.

Construction Waste. During the construction of the Merge 56 project, the construction debris generated is expected to include the materials listed in Table 4.1~~2~~. Materials shall be source separated as indicated in Table 4.1. A detailed list of materials is unknown at this time. Table 4.1 is a place holder for when exact material tonnage is available.

The City of San Diego ESD requires projects to estimate tonnage of expected construction waste. The Merge 56 project includes approximately 525,000 square feet of new construction. As provided by Environmental Services Department and for purposes of this Waste Management Plan, The Merge 56 project utilizes the Environmental Protection Agency (EPA), 3 pounds of waste per square foot for waste generation on new commercial/office construction to calculate expected tonnage as follows:

525,000 sq. ft. x 3/2,000lbs = 788 tons

In addition to commercial/office waste, the residential construction waste calculated estimated as shown below.

Residential Construction Waste			
Units	Square Footage	4.38 lbs/sq ft*	Tons
242	555,582	2,433,449	1,217
*http://www.cccounty.us/4746/CalGreen-Construction-Demolition-Debris-			

The 2,004~~788~~ tons is an assumption and is used as a place holder until further detail is provided and the hired contractor can accurately assess expected waste. Further, the exact quantity of each material is unknown at this time. The Merge 56 contractors shall source separate waste materials according to the material types in Table 4.1~~2~~ in order to exceed the 75% diversion.

Table 4.1: Estimated Construction Waste

Expected Bin Capacity Needed	**Material Type**	**Generated** (tons)	**Handling**	**Diverted**	**Disposed**
One 40-yard bin, will require service about 3 times.	Clean Wood (Forming and framing lumber)	400	Inland Pacific or Miramar Greenery	400	0
One 40-yard bin, will require service about 3 times.	Metals (Pipes, rebar, flashing, steel, aluminum, copper, brass, stainless steel)	36	Pacific Steel, for example.	36	0
One 40-yard bin, will require service a couple of times.	Polystyrene	10	Cactus Recycling	~~3~~10	0
Two 40-yard bins, will require bi-weekly service.	Blocks, bricks	100	Hanson Aggregates West - Miramar	100	0
Two 40-yard bins, will require bi-weekly service.	Asphalt, concrete,	28	Hanson Aggregates West - Miramar	28	0
Two 40-yard bins, will require weekly service.	Trash (Treated wood)	300	Miramar Landfill	0	300

One 40-yard bin, will require service about 3 times.	Roofing	20	LEED Recycling	20	0
At least four 40-yard bins, will require weekly service.	Mixed Debris (Insulation, vinyl, doors, floor tile, plastic pipes, film, broken glass, drywall)	946	EDCO CDI Recycling	832.48	113.52
One 40-yard bin, will require service a couple of times.	Cardboard	70	EDCO CDI Recycling	70	0
One 40-yard bin, will require service about 2 times.	Carpet/Carpet padding	94	DFS Flooring, for example	94	0
-	-	2,004	-	159~~5~~0.48	413.52

Based on these estimates, and on providing segregation of these materials, the project would accomplish 7~~7~~9% diversion of construction waste. An estimated ~~180~~ 414 tons would end up going to landfill disposal. To ensure this result, contractors will be required to comply with the following methods and procedures below:

1. Construction and Land-Clearing containers will be provided for waste that is to be recycled. Containers shall be clearly labeled, with a list of acceptable and unacceptable materials. The list of acceptable materials must be the same as the materials recycled at the receiving material recovery facility or recycling processor.

2. The collection containers for recyclable Construction and Land-Clearing waste must contain no more than 10% non-recyclable materials, by volume.

3. Use detailed material estimates to reduce risk of unplanned and potentially wasteful material cuts.

4. Conduct daily visual inspections of dumpsters and recycling bins to remove contaminants.

5. Remove demolition and construction waste materials from the project site at least once every week to ensure no over-topping of waste bins. The accumulation and burning of on-site Construction, Demolition, and Land-Clearing waste materials will be prohibited.

Furthermore, the Merge 56 project will be required to meet the following State law and City of San Diego Municipal Code requirements:

1. The City's C&D Debris Diversion Deposit Program which requires a refundable deposit based on the tonnage and value of the expected recyclable waste materials as part of the building permit requirements.

2. The City's C&D Recycling Ordinance which requires identification and sorting of demolition and construction waste materials to be diverted to the appropriate recycling facility.

3. The City's Recycling Ordinance which requires that collection of recyclable materials must be provided.

4. The City's Storage Ordinance which requires that areas for recyclable material collection must be provided.

5. This Waste Management Plan –The waste contractor will provide monthly reports regarding the amount of waste and recyclable materials to the Merge 56 SWMC who will be responsible for compliance actions with the aforementioned guidelines and make adjustments as needed to maintain conformance. The name and contact information of the waste contractor and SWMC will be provided to ESD at least 10 days prior to the start of any work and updated within 5 days of any changes.

5.0 OCCUPANCY WASTE

The Merge 56 development will be managed under Sea Breeze Properties. During the Occupancy Phase, it is estimated that approximately 416 tons per year will be generated by the new development (Refer to Table 5.1). The expected waste generation was calculated using information obtained from CalRecycle as shown in Table 5.1.

Table 5.1: Waste Generation – Occupancy Waste

	Square Footage/Units	**Generation Factor***	**Tons Per Year**
Proposed Residential	242	4lb/unit/day	177
Proposed Commercial	525,000	2.5lb/1,000 sq. ft./day	240
Total Proposed Estimated Occupancy Tonnage Per Year			**416**
*Generation Factors were obtained from CalRecycle's collection of estimated waste during occupancy.			

The Merge 56 project will be required to comply with City of San Diego Municipal Code section 142.0830 Refuse and Recyclable Material Storage Regulations for Residential and Non-Residential Development (Table 142.08B & 142.08C) as seen in Appendix 3. The minimum storage amount required can be found in Tables 5.2 and 5.3 below.

Table 5.2: Minimum Exterior Refuse and Recyclable Material Storage Areas for Residential Development

Dwelling Units	Minimum Refuse Storage Area Per Development (Square Feet)	Minimum Recyclable Material Storage Area Per Development (Square Feet)	Total Storage Required (Square Footage)
242	463	463	952

Table 5.3: Minimum Exterior Refuse and Recyclable Material Storage Areas for Non-Residential Development

Gross Floor Area	Minimum Refuse Storage Area Per Development (Square Feet)	Minimum Recyclable Material Storage Area Per Development (Square Feet)	Total Storage Required (Square Footage)
525,000	1,008	1,008	2,016

In order to continually reduce waste delivered to the landfill during the life of the project, trash, recycling, and green waste bins will be provided for each development. Information will be provided to residents to encourage recycling of all paper products, cardboard, glass, aluminum cans, recyclable plastics, and yard waste.

Compliance with the recycling ordinance, which requires the provision of educational materials and separate recycling bins, and with the storage ordinance, which requires that sufficient space for recycling bins be provided, is estimated to reduce waste by 40%. Thus 250 tons per year would still be destined for disposal. Additional measures often taken to help mitigate this quantity of trash include:

- ~~Ensuring that concrete from demolition is minimized, used onsite when possible, and what remains is composted.~~
- Surpass the 75% waste reduction target during ~~demolition and~~ construction.
- Providing recyclable materials collection in outdoor and parking areas.
- ~~Providing post-consumer content in building materials.~~
- ~~Providing foodwaste collection, onsite composting, or other specialized waste reduction measures, such as recycling chutes or other design features.~~

~~This project would provide the second and third of these measures.~~

6.0 CONCLUSION

The Merge 56 project anticipates ~~788~~ 2,004 tons of construction waste. Merge 56, LLC will utilize several certified facilities; the facility used is subject to change at the discretion of the WMC, provided the facility used attains the same or better certified waste diversion rate. The goal of The Merge 56 development is to exceed the 75% diversion target for construction waste. This WMP estimates that of the ~~788~~ 2,004 tons of construction waste, approximately 77% will be diverted. These tonnages are only estimates.

To ensure that waste is properly managed, Merge 56, LLC shall establish waste management contract language ensuring:

- ~~In the event any existing sidewalks, concrete or asphalt are demolished to accommodate the new streets, demolition materials will be reused or recycled onsite;~~
- Sufficient number of bins are provided, properly used, and their contents taken to appropriate facilities.
- Daily inspections occur to prevent overflow, assuring correct labeling of dumpsters, and that no more than 10% by volume of contamination occurs in each bin.
- Over-purchasing of construction materials is minimized.

Merge 56, LLC will ensure that the Environmental Services Department is included in the precon prior to demolition activities to verify these project features and contract language.

Merge 56, LLC is committed to establishing recycling guidelines throughout the Preconstruction, Construction, and Occupancy phases. A WMC will be assigned to the Merge 56 project. The Coordinator will ensure compliance with the San Diego Municipal Code, Recycling Ordinance, Refuse, Construction and Demolition Recycling Ordinance, and Recyclable Materials Storage Regulations and aim to exceed the 75% diversion goal for demolition and construction waste by providing appropriate salvage, segregation, and recycling.

APPENDIX 1

CONSTRUCTION & DEMOLITION RECYCLING FACILITIES DIRECTORY

THE CITY OF SAN DIEGO

2014 Certified Construction & Demolition Recycling Facility Directory

These facilities are certified by the City of San Diego to accept materials listed in each category. Hazardous materials are not accepted. The diversion rate for these materials shall be considered 100%, except mixed C&D debris which updates quarterly. The City is not responsible for changes in facility information. Please call ahead to confirm details such as accepted materials, days and hours of operation, limitations on vehicle types, and cost. For more information visit: www.recyclingworks.com.

Please note: In order to receive recycling credit, Mixed C&D Facility and transfer station receipts must: *-be coded as construction & demolition (C&D) debris* *-have project address or permit number on receipt* **Make sure to notify weighmaster that your load is subject to the City of San Diego C&D Ordinance.* ***Note about landfills: Miramar Landfill and other landfills do not recycle mixed C&D debris.***	**Mixed C&D Debris**	**Asphalt /Concrete**	**Brick/Block/Rock**	**Building Materials for Reuse**	**Cardboard**	**Carpet**	**Carpet Padding**	**Ceiling Tile**	**Ceramic Tile / Porcelain**	**Clean Fill Dirt**	**Clean Wood / Green Waste**	**Drywall**	**Industrial Plastics**	**Lamps / Light Fixtures**	**Metal**	**Mixed Inerts**	**Styrofoam Blocks**
EDCO Recovery & Transfer 3660 Dalbergia St, San Diego, CA 92113 619-234-7774 | www.edcodisposal.com/public-disposal	66%											●					
EDCO Station Transfer Station & Buy Back Center 8184 Commercial St, La Mesa, CA 91942 619-466-3355 | www.edcodisposal.com/public-disposal	66%				●							●			●		
EDCO CDI Recycling & Buy Back Center 224 S. Las Posas Rd, San Marcos, CA 92078 760-744-2700 | www.edcodisposal.com/public-disposal	88%				●										●		
Escondido Resource Recovery 1044 W. Washington Ave, Escondido 760-745-3203 | www.edcodisposal.com/public-disposal	66%																
Fallbrook Transfer Station & Buy Back Center 550 W. Aviation Rd, Fallbrook, CA 92028 760-728-6114 | www.edcodisposal.com/public-disposal	66%				●										●		
Otay C&D/Inert Debris Processing Facility 1700 Maxwell Rd, Chula Vista, CA 91913 619-421-3773 | www.sd.disposal.com	65%																
Ramona Transfer Station & Buy Back Center 324 Maple St, Ramona, CA 92065 760-789-0516 | www.edcodisposal.com/public-disposal	66%				●										●		
SANCO Resource Recovery & Buy Back Center 6750 Federal Blvd, Lemon Grove, CA 91945 619-287-5696 | www.edcodisposal.com/public-disposal	66%				●										●		
All American Recycling 10805 Kenney St, Santee, CA 92071 619-508-1155 (Must call for appointment)						●											
Allan Company 6733 Consolidated Wy, San Diego, CA 92121 858-578-9300 | www.allancompany.com/facilities.htm					●										●		
Allan Company Miramar Recycling 5165 Convoy St, San Diego, CA 92111 858-268-8971 | www.allancompany.com/facilities.htm					●										●		
Allan Company 8514 Mast Blvd, Santee, CA 92701 619-448-4295 | www.allancompany.com/facilities.htm					●										●		
AMS 4674 Cardin St, San Diego, CA 92111 858-541-1977 | www.a-m-s.com								●									
AMS 1120 West Mission Ave, Escondido, CA 92025 858-541-1977 | www.a-m-s.com								●									
Armstrong World Industries, Inc. 300 S. Myrida St, Pensacola, FL 32505 877-276-7876 (Press 1, Then 8) www.armstrong.com/commceilingsna								●									
Cactus Recycling 8710 Avenida De La Fuente, San Diego, CA 92154 619-661-1283 | www.cactusrecycling.com					●								●		●		●

	Mixed C&D Debris	Asphalt /Concrete	Brick/Block/Rock	Building Materials for Reuse	Cardboard	Carpet	Carpet Padding	Ceiling Tile	Ceramic Tile / Porcelain	Clean Fill Dirt	Clean Wood / Green Waste	Drywall	Industrial Plastics	Lamps / Light Fixtures	Metal	Mixed Inerts	Styrofoam Blocks
DFS Flooring 10178 Willow Creek Road, San Diego, CA 92131 858-630-5200 | www.dfsflooring.com						●	●										
Enniss Incorporated 12421 Vigilante Rd, Lakeside, CA 92040 619-443-9024 | www.enniss.net		●	●						●	●							
Escondido Sand and Gravel 500 N. Tulip St, Escondido, CA 92025 760-432-4690 | www.weirasphalt.com/esg		●															
Habitat for Humanity ReStore 10222 San Diego Mission Rd, San Diego, CA 92108 619-516-5267 | www.sdhfh.org/restore.php				●													
Hanson Aggregates West – Lakeside Plant 12560 Highway 67, Lakeside, CA 92040 858-547-2141		●															
Hanson Aggregates West – Miramar 9229 Harris Plant Rd, San Diego, CA 92126 858-974-3849		●								●							
Hidden Valley Steel & Scrap, Inc. 1342 Simpson Wy, Escondido, CA 92029 760-747-6330															●		
HVAC Exchange 2675 Faivre St, Chula Vista, CA 91911 619-423-1855 | www.thehvacexchange.com															●		
IMS Recycling Services 2740 Boston Ave, San Diego, CA 92113 619-231-2521 | www.imsrecyclingservices.com					●								●				
IMS Recycling Services 2697 Main St, San Diego, CA 92113 619-231-2521 | www.imsrecyclingservices.com													●		●		
Inland Pacific Resource Recovery 12650 Slaughterhouse Canyon Rd, Lakeside, CA 92040 619-390-1418											●						
Lakeside Land Co., Inc. 10101 Riverford Rd, Lakeside, CA 92040 619-449-9083 | www.lakesideland.com		●														●	
Lamp Disposal Solutions 8248 Ronson Ct, San Diego, CA 92111 858-569-1807 | www.lampdisposalsolutions.com														●			
Lights Out Disposal 1097 Palm Ave, Ste 100, El Cajon, CA 92020 619-438-1093 | www.lightsoutdisposal.com														●			
Los Angeles Fiber Company 4920 S. Boyle Ave, Vernon, CA 90058 323-589-5637 | www.lafiber.com						●	●										
Miramar Greenery, City of San Diego 5180 Convoy St, San Diego, CA 92111 858-694-7000 | www.sandiego.gov/environmental-services/miramar/greenery.shtml											●						
Moody's 3210 Oceanside Blvd., Oceanside, CA 92056 760-433-3316		●								●						●	
Otay Valley Rock, LLC 2041 Heritage Rd, Chula Vista, CA 91913 619-591-4717 | www.otayrock.com		●															
Pacific Steel, Inc. 1700 Cleveland Ave, National City, CA 91950 619-474-7081															●		
Reclaimed Aggregates Chula Vista 855 Energy Wy, Chula Vista, CA 91913 619-656-1836		●														●	

	Mixed C&D Debris	Asphalt /Concrete	Brick/Block/Rock	Building Materials for Reuse	Cardboard	Carpet	Carpet Padding	Ceiling Tile	Ceramic Tile / Porcelain	Clean Fill Dirt	Clean Wood / Green Waste	Drywall	Industrial Plastics	Lamps / Light Fixtures	Metal	Mixed Inerts	Styrofoam Blocks
Reconstruction Warehouse 3341 Hancock St., San Diego, CA 92110 619-795-7326 | www.recowarehouse.com				●													
Robertson's Ready Mix 2094 Willow Glen Dr, El Cajon, CA 92019 619-593-1856		●								●						●	
Romero General Construction Corp. 8354 Nelson Wy, Escondido, CA 92026 760-749-9312 | www.romerogc.com/crushing/nelsonway.htm		●															
SA Recycling 3055 Commercial St., San Diego, CA 92113 619-238-6740 | www.sarecycling.com															●		
SA Recycling 1211 S. 32nd St., San Diego, CA 92113 619-234-6691 | www.sarecycling.com															●		
Vulcan Carol Canyon Landfill and Recycle Site 10051 Black Mountain Rd, San Diego, CA 92126 858-530-9465 | www.vulcanmaterials.com/carrollcanyon		●	●							●						●	

APPENDIX 2

REFUSE & RECYCLE

STORAGE REGULATIONS

Article 2: General Development Regulations

Division 8: Refuse and Recyclable Materials Storage Regulations

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§142.0801 Purpose of Refuse and Recyclable Materials Storage Regulations

The purpose of these regulations is to provide permanent, adequate, and convenient space for the storage and collection of refuse and *recyclable material*. The intent of these regulations is to encourage recycling of solid waste to reduce the amount of waste material entering landfills and to meet the recycling goals established by the City Council and mandated by the state of California.
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§142.0805 When Refuse and Recyclable Materials Storage Regulations Apply

Refuse and recyclable materials storage shall be provided for the following types of *development* as indicated in Table 142-08A:

(a) New residential *development* projects involving two or more *dwelling units*,

(b) New nonresidential *development,* or

(c) Additions to existing *multiple dwelling unit* residential, commercial or industrial *development* where the *gross floor area* would be increased by 30 percent or more.

Table 142-08A
Refuse and Recyclable Material Storage Regulations
Applicability

Type of *Development* Proposal	**Applicable Regulations**	**Required Permit Type/Decision Process**
Development- of a *single dwelling unit*	Exempt from this division	Exempt from this division
New residential *development* involving two or more *dwelling units*	Sections 142.0810 and 142.0820	No permit required by this division
New nonresidential development	Sections 142.0810 and 142.0830	No permit required by this division
Additions to existing *multiple dwelling unit* residential, commercial, or industrial *development* where the *gross floor area* would be increased by 30 percent or more	Sections 142.0810, 142.0820 and 142.0830	No permit required by this division

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)
(Amended 11-13-08 by O-19799 N.S; effective 12-13-2008.)

§142.0810 General Regulations for Refuse and Recyclable Material Storage

New residential *development* as indicated in Section 142.0805 shall provide on-site areas for the storage of refuse and *recyclable material* that meet the following standards:

(a) Size of Material Storage Areas. The size of required material storage areas shall meet or exceed the minimum requirements in Tables 142-08B and 142-08C.

(b) Location of Material Storage Areas

(1) Material storage areas may be located in a designated interior area that is not in a *dwelling unit*.

(2) Material storage areas may be located outside a *structure* in required rear *yards* or in required side *yards*. Exterior material storage areas shall not be located in any front *yard*, street side yard, *street yard* area, parking area, landscaped area, or any other area required by the Municipal Code to be constructed or maintained unencumbered according to fire or other applicable building or public safety laws.

(3) Material storage areas shall be accessible to occupants and haulers.

(4) *Premises* served by an *alley* shall provide material storage areas that are directly accessible from the *alley*.

(5) One *sign* identifying the material storage area is required for each area and shall be posted on the exterior of the material storage area near the point of access. The maximum *sign copy area* permitted for each *sign* shall be one square foot.

(6) For commercial *development* on *premises* not served by an *alley*, material storage areas shall be located at least 25 feet from any *street* or sidewalk.

(c) *Screening* of Material Storage Areas. Material storage areas located outside any *structure* shall be *screened* with a minimum 6-foot-high solid *screening* enclosure that is designed to be architecturally consistent with the primary *structure*. Refuse, *recyclable material*, and material storage containers shall not exceed the height of the solid *screening* enclosure.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)
(Amended 11-28-2005 by O-19444 N.S.; effective 2-9-2006.)
(Amended 11-13-08 by O-19799 N.S; effective 12-13-2008.)

§142.0820 Refuse and Recyclable Materials Storage Regulations for Residential Development

Applicable residential *development* in accordance with Section 142.0805, shall provide interior and exterior refuse and recycling storage areas as specified below:

(a) Interior Refuse and *Recyclable Material* Storage. Each *dwelling unit* shall be equipped with an interior refuse and *recyclable material* storage area.

(b) Exterior Refuse and *Recyclable Material* Storage. Each *structure* that contains *dwelling units* shall provide at least one exterior storage area. The total storage area~~s~~ requirement is based on the number of *dwelling units* in the *development* as shown in Table 142-08B and includes the sum of all residential material storage areas located outside of individual *dwelling units*.

Table 142-08B
Minimum Exterior Refuse and
Recyclable Material Storage Areas for
Residential Development

Number of Dwelling Units Per Development	**Minimum Refuse Storage Area Per Development** (Square Feet)	**Minimum *Recyclable Material* Storage Area Per Development** (Square Feet)	**Total Minimum Storage Area Per Development** (Square Feet)
2-6	12	12	24
7-15	24	24	48
16-25	48	48	96
26-50	96	96	192
51-75	144	144	288
76-100	192	192	384
101-125	240	240	480
126-150	288	288	576
151-175	336	336	672
176-200	384	384	768
201+	384 plus 48 square feet for every 25 dwelling units above 201	384 plus 48 square feet for every 25 dwelling units above 201	768 plus 96 square feet for every 25 dwelling units above 201

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)
(Amended 3-1-2006 by O-19468 N.S.; effective 4-1-2006.)
(Amended 11-13-08 by O-19799 N.S; effective 12-13-2008.)

§142.0830 Refuse and Recyclable Material Storage Regulations for Nonresidential Development

(a) All new nonresidential *development,* or additions to existing commercial or industrial *development* where the *gross floor area* would be increased by 30 percent or more, shall provide at least one exterior refuse and *recyclable material* storage area for each building. The total storage area requirement is based on the *gross floor area* of the nonresidential buildings on the *premises*, as shown in Table 142-08C and includes the sum of all nonresidential refuse and recyclable material storage areas.

(b) Where a *development* includes residential as part of a mixed use project, the *development* shall provide refuse and *recyclable material* storage for the residential portion of the project in accordance with Table 142-08B, in addition to the storage areas required by Table 142-08C for the nonresidential *development*.

Table 142-08C
Minimum Exterior Refuse and Recyclable Material Storage Areas for Nonresidential Development

Gross Floor Area Per Development (Square Feet)	**Minimum Refuse Storage Area Per Development** (Square Feet)	**Minimum *Recyclable Material* Storage Area Per Development** (Square Feet)	**Total Minimum Area Per Development** (Square Feet)
0-5,000	12	12	24
5,000-10,000	24	24	48
10,001-25,000	48	48	96
25,001-50,000	96	96	192
50,001-75,000	144	144	244
75,001-100,000	192	192	384
100,001+	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	384 plus 96 square feet for every 25,000 square feet of building area above 100,001

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)
(Amended 11-13-08 by O-19799 N.S; effective 12-13-2008.)

APPENDIX K

Air Emissions Memorandum

Scientific Resources Associated
1328 Kaimalino Lane
San Diego, CA 92109

Memorandum

To: Latitude 33 Planning and Engineering **From:** Valorie Thompson

Re: Merge 56 Project
Air Emissions **Date:** December 11, 2015

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

This Technical Memorandum provides an evaluation of air emissions associated with the Merge 56 Project. The project proposes to construct approximately 525,000 square feet of commercial, office, theater and hotel uses and up to 242 residential dwelling units.

To evaluate air emissions from the construction and operation of the project, SRA ran the CalEEMod Model, which is the current air emissions model recommended by the California Air Resources Board for evaluating emissions from land use projects. Emissions from construction were based on the proposed construction scenario and schedule. Emissions from operation of the project included vehicle emissions, area source emissions, and energy use emissions. Emissions were then compared with significance thresholds from the City of San Diego Significance Determination Thresholds[1].

Table 1 presents a comparison of the construction emissions with the City's thresholds. As shown in Table 1, the construction emissions are below the City's significance thresholds.

---

[1] City of San Diego. 2011. *Significance Determination Thresholds*. January.

Table 1
Construction Emissions

	ROG	**NOx**	**CO**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions, lbs/day						
Maximum Daily Emissions[1]	29.46	79.14	70.36	0.13	12.64	7.14
Significance Criteria	137	250	550	250	100	55[2]
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

[1] Based on CalEEMod Model. Maximum daily emissions calculated for each pollutant separately, and may not occur on the same day for each pollutant.
[2] Because the City has not adopted a threshold for $PM_{2.5}$, the South Coast Air Quality Management District threshold was used.

Table 2 presents a comparison of the operational emissions with the City's thresholds. As shown in Table 2, the operational emissions are below the City's significance thresholds.

Table 2
Operational Emissions

	ROG	**NOx**	**CO**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Summer Day Emissions, lbs/day						
Area Sources	27.22	0.23	19.99	0.001	0.22	0.22
Energy Use	0.57	5.15	3.92	0.03	0.40	0.40
Vehicular Emissions	53.91	92.55	449.56	1.11	74.78	20.81
Total	**81.71**	**92.93**	**473.47**	**1.14**	**75.40**	**21.43**
Significance Criteria	137	250	550	250	100	55[1]
Significant?	*No*	*No*	*No*	*No*	*No*	*No*
Winter Day Emissions, lbs/day						
Area Sources	27.22	0.23	19.99	0.001	0.22	0.22
Energy Use	0.57	5.15	3.92	0.03	0.40	0.40
Vehicular Emissions	57.84	98.09	494.73	1.05	74.79	20.82
Total	**85.63**	**103.47**	**518.64**	**1.09**	**75.41**	**21.44**
Significance Criteria	137	250	550	250	100	55[1]
Significant?	*No*	*No*	*No*	*No*	*No*	*No*

[1] Because the City has not adopted a threshold for $PM_{2.5}$, the South Coast Air Quality Management District threshold was used.

Therefore, an evaluation of the project's air emissions indicate that the emissions would be below the City's significance thresholds, and no significant air quality impact would result from construction or operation.

Valorie L. Thompson

Valorie L. Thompson, Ph.D.

Principal

Merge 56 GHG Analysis

San Diego Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	296.26	1000sqft	6.80	296,263.00	0
Pharmacy/Drugstore w/o Drive Thru	15.00	1000sqft	0.34	15,000.00	0
Hotel	120.00	Room	4.00	174,240.00	0
Movie Theater (No Matinee)	45.45	1000sqft	1.04	45,453.00	0
Apartments Low Rise	47.00	Dwelling Unit	1.78	47,000.00	134
Condo/Townhouse	111.00	Dwelling Unit	4.22	111,000.00	317
Single Family Housing	84.00	Dwelling Unit	10.40	151,200.00	240
Regional Shopping Center	101.28	1000sqft	2.33	101,284.00	0
Strip Mall	9.00	1000sqft	0.21	9,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Construction Phase - Assuming painting and paving occur as phases are constructed

Area Coating - Rule 67.0.1 coatings

Table Name	Column Name	Default Value	New Value

tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	100
tblConstructionPhase	NumDays	35.00	296.00
tblConstructionPhase	NumDays	35.00	297.00
tblConstructionPhase	PhaseEndDate	5/10/2018	5/10/2017
tblConstructionPhase	PhaseEndDate	3/23/2018	3/22/2017
tblConstructionPhase	PhaseStartDate	3/23/2017	3/23/2016
tblConstructionPhase	PhaseStartDate	2/2/2017	2/2/2016
tblFireplaces	NumberGas	25.85	0.00
tblFireplaces	NumberGas	61.05	0.00
tblFireplaces	NumberGas	46.20	84.00
tblFireplaces	NumberNoFireplace	4.70	47.00
tblFireplaces	NumberNoFireplace	11.10	111.00
tblFireplaces	NumberNoFireplace	8.40	0.00
tblFireplaces	NumberWood	16.45	0.00
tblFireplaces	NumberWood	38.85	0.00
tblFireplaces	NumberWood	29.40	0.00
tblLandUse	LandUseSquareFeet	296,260.00	296,263.00
tblLandUse	LandUseSquareFeet	45,450.00	45,453.00
tblLandUse	LandUseSquareFeet	101,280.00	101,284.00
tblLandUse	LotAcreage	2.94	1.78
tblLandUse	LotAcreage	6.94	4.22
tblLandUse	LotAcreage	27.27	10.40

tblProjectCharacteristics	OperationalYear	2014	2019
tblVehicleTrips	ST_TR	7.16	6.00
tblVehicleTrips	ST_TR	7.16	8.00
tblVehicleTrips	ST_TR	2.37	12.95
tblVehicleTrips	ST_TR	8.19	8.00
tblVehicleTrips	ST_TR	90.06	90.00
tblVehicleTrips	ST_TR	49.97	70.00
tblVehicleTrips	ST_TR	10.08	10.00
tblVehicleTrips	ST_TR	42.04	100.00
tblVehicleTrips	SU_TR	6.07	6.00
tblVehicleTrips	SU_TR	6.07	8.00
tblVehicleTrips	SU_TR	0.98	12.95
tblVehicleTrips	SU_TR	5.95	8.00
tblVehicleTrips	SU_TR	90.06	90.00
tblVehicleTrips	SU_TR	25.24	70.00
tblVehicleTrips	SU_TR	8.77	10.00
tblVehicleTrips	SU_TR	20.43	100.00
tblVehicleTrips	WD_TR	6.59	6.00
tblVehicleTrips	WD_TR	6.59	8.00
tblVehicleTrips	WD_TR	11.01	12.95
tblVehicleTrips	WD_TR	8.17	8.00
tblVehicleTrips	WD_TR	90.06	90.00
tblVehicleTrips	WD_TR	42.94	70.00
tblVehicleTrips	WD_TR	9.57	10.00
tblVehicleTrips	WD_TR	44.32	100.00
tblWoodstoves	NumberCatalytic	2.35	0.00
tblWoodstoves	NumberCatalytic	5.55	0.00
tblWoodstoves	NumberCatalytic	4.20	0.00
tblWoodstoves	NumberNoncatalytic	2.35	0.00
tblWoodstoves	NumberNoncatalytic	5.55	0.00

tblWoodstoves	NumberNoncatalytic	4.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.8518	79.1371	53.0025	0.0967	8.8376	3.8035	12.6411	3.6401	3.4992	7.1393	0.0000	9,191.3351	9,191.3351	1.9459	0.0000	9,232.1980
2016	29.5606	67.5667	70.3603	0.1311	4.6483	3.6411	8.2894	1.2504	3.4039	4.6542	0.0000	12,387.8669	12,387.8669	1.6182	0.0000	12,421.8500
2017	28.7778	61.7043	67.0158	0.1311	4.6483	3.2834	7.9317	1.2504	3.0689	4.3193	0.0000	12,116.1007	12,116.1007	1.5864	0.0000	12,149.4143
Total	**65.1902**	**208.4081**	**190.3786**	**0.3589**	**18.1343**	**10.7279**	**28.8622**	**6.1409**	**9.9719**	**16.1128**	**0.0000**	**33,695.3027**	**33,695.3027**	**5.1505**	**0.0000**	**33,803.4622**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.8518	79.1371	53.0025	0.0967	8.8376	3.8035	12.6411	3.6401	3.4992	7.1393	0.0000	9,191.3351	9,191.3351	1.9459	0.0000	9,232.1980
2016	29.5606	67.5667	70.3603	0.1311	4.6483	3.6411	8.2894	1.2504	3.4039	4.6542	0.0000	12,387.8669	12,387.8669	1.6182	0.0000	12,421.8500
2017	28.7778	61.7043	67.0158	0.1311	4.6483	3.2834	7.9317	1.2504	3.0689	4.3193	0.0000	12,116.1007	12,116.1007	1.5864	0.0000	12,149.4143
Total	**65.1902**	**208.4081**	**190.3786**	**0.3589**	**18.1343**	**10.7279**	**28.8622**	**6.1409**	**9.9719**	**16.1128**	**0.0000**	**33,695.3027**	**33,695.3027**	**5.1505**	**0.0000**	**33,803.4622**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	27.2335	0.2330	20.1336	1.0600e-003		0.2228	0.2228		0.2216	0.2216	0.0000	1,814.9017	1,814.9017	0.0697	0.0326	1,826.4756
Energy	0.6505	5.8433	4.4521	0.0355		0.4494	0.4494		0.4494	0.4494		7,096.2855	7,096.2855	0.1360	0.1301	7,139.4723
Mobile	55.5365	101.1312	486.0095	1.2377	82.4740	1.4355	83.9095	22.0155	1.3242	23.3397		97,965.6002	97,965.6002	3.7946		98,045.2865
Total	**83.4205**	**107.2075**	**510.5952**	**1.2742**	**82.4740**	**2.1077**	**84.5818**	**22.0155**	**1.9953**	**24.0108**	**0.0000**	**106,876.7873**	**106,876.7873**	**4.0003**	**0.1627**	**107,011.2343**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	27.2246	0.2315	19.9878	1.0500e-003		0.2220	0.2220		0.2208	0.2208	0.0000	1,814.5761	1,814.5761	0.0692	0.0326	1,826.1392
Energy	0.5732	5.1492	3.9227	0.0313		0.3961	0.3961		0.3961	0.3961		6,253.4626	6,253.4626	0.1199	0.1147	6,291.5201
Mobile	53.9106	92.5469	449.5643	1.1081	73.4844	1.2961	74.7804	19.6159	1.1956	20.8115		87,709.0987	87,709.0987	3.4375		87,781.2857
Total	**81.7085**	**97.9276**	**473.4749**	**1.1405**	**73.4844**	**1.9141**	**75.3984**	**19.6159**	**1.8125**	**21.4283**	**0.0000**	**95,777.1374**	**95,777.1374**	**3.6266**	**0.1473**	**95,898.9450**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	2.05	8.66	7.27	10.50	10.90	9.19	10.86	10.90	9.16	10.76	0.00	10.39	10.39	9.34	9.50	10.38

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2015	3/4/2015	5	45	
2	Building Construction	Building Construction	3/5/2015	2/1/2017	5	500	
3	Paving	Paving	2/2/2016	3/22/2017	5	297	
4	Architectural Coating	Architectural Coating	3/23/2016	5/10/2017	5	296	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 626,130; Residential Outdoor: 208,710; Non-Residential Indoor: 961,860; Non-Residential Outdoor: 320,620

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	371.00	131.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	74.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980		6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**8.6733**	**3.8022**	**12.4755**	**3.5965**	**3.4980**	**7.0945**		**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0767	0.0904	0.9888	2.0800e-003	0.1643	1.2900e-003	0.1656	0.0436	1.1800e-003	0.0448		180.0017	180.0017	9.4300e-003		180.1998
Total	**0.0767**	**0.0904**	**0.9888**	**2.0800e-003**	**0.1643**	**1.2900e-003**	**0.1656**	**0.0436**	**1.1800e-003**	**0.0448**		**180.0017**	**180.0017**	**9.4300e-003**		**180.1998**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980	0.0000	6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**8.6733**	**3.8022**	**12.4755**	**3.5965**	**3.4980**	**7.0945**	**0.0000**	**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0767	0.0904	0.9888	2.0800e-003	0.1643	1.2900e-003	0.1656	0.0436	1.1800e-003	0.0448		180.0017	180.0017	9.4300e-003		180.1998
Total	**0.0767**	**0.0904**	**0.9888**	**2.0800e-003**	**0.1643**	**1.2900e-003**	**0.1656**	**0.0436**	**1.1800e-003**	**0.0448**		**180.0017**	**180.0017**	**9.4300e-003**		**180.1998**

3.3 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904		2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**		**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.5465	14.2887	15.9150	0.0312	0.8695	0.2341	1.1036	0.2481	0.2153	0.4633		3,162.7268	3,162.7268	0.0274		3,163.3018
Worker	1.4222	1.6773	18.3429	0.0386	3.0477	0.0239	3.0716	0.8084	0.0219	0.8303		3,339.0312	3,339.0312	0.1750		3,342.7065

Total	**2.9687**	**15.9660**	**34.2579**	**0.0699**	**3.9171**	**0.2581**	**4.1752**	**1.0564**	**0.2372**	**1.2936**		**6,501.7580**	**6,501.7580**	**0.2024**		**6,506.0083**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904	0.0000	2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**	**0.0000**	**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.5465	14.2887	15.9150	0.0312	0.8695	0.2341	1.1036	0.2481	0.2153	0.4633		3,162.7268	3,162.7268	0.0274		3,163.3018
Worker	1.4222	1.6773	18.3429	0.0386	3.0477	0.0239	3.0716	0.8084	0.0219	0.8303		3,339.0312	3,339.0312	0.1750		3,342.7065
Total	**2.9687**	**15.9660**	**34.2579**	**0.0699**	**3.9171**	**0.2581**	**4.1752**	**1.0564**	**0.2372**	**1.2936**		**6,501.7580**	**6,501.7580**	**0.2024**		**6,506.0083**

3.3 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.3665	12.4152	14.5726	0.0312	0.8695	0.1877	1.0572	0.2481	0.1726	0.4207		3,125.5087	3,125.5087	0.0242		3,126.0159
Worker	1.2969	1.5219	16.5979	0.0386	3.0477	0.0229	3.0706	0.8084	0.0210	0.8294		3,222.2536	3,222.2536	0.1615		3,225.6439
Total	**2.6634**	**13.9371**	**31.1704**	**0.0698**	**3.9172**	**0.2106**	**4.1278**	**1.0565**	**0.1937**	**1.2501**		**6,347.7623**	**6,347.7623**	**0.1856**		**6,351.6599**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.3665	12.4152	14.5726	0.0312	0.8695	0.1877	1.0572	0.2481	0.1726	0.4207		3,125.5087	3,125.5087	0.0242		3,126.0159
Worker	1.2969	1.5219	16.5979	0.0386	3.0477	0.0229	3.0706	0.8084	0.0210	0.8294		3,222.2536	3,222.2536	0.1615		3,225.6439
Total	**2.6634**	**13.9371**	**31.1704**	**0.0698**	**3.9172**	**0.2106**	**4.1278**	**1.0565**	**0.1937**	**1.2501**		**6,347.7623**	**6,347.7623**	**0.1856**		**6,351.6599**

3.3 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.2526	11.1023	13.6782	0.0311	0.8696	0.1630	1.0325	0.2481	0.1499	0.3980		3,072.7083	3,072.7083	0.0228		3,073.1877
Worker	1.1787	1.3831	15.0121	0.0386	3.0477	0.0222	3.0698	0.8084	0.0204	0.8288		3,097.9147	3,097.9147	0.1494		3,101.0515
Total	**2.4313**	**12.4854**	**28.6903**	**0.0697**	**3.9172**	**0.1851**	**4.1024**	**1.0565**	**0.1703**	**1.2268**		**6,170.6230**	**6,170.6230**	**0.1722**		**6,174.2392**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.2526	11.1023	13.6782	0.0311	0.8696	0.1630	1.0325	0.2481	0.1499	0.3980		3,072.7083	3,072.7083	0.0228		3,073.1877
Worker	1.1787	1.3831	15.0121	0.0386	3.0477	0.0222	3.0698	0.8084	0.0204	0.8288		3,097.9147	3,097.9147	0.1494		3,101.0515
Total	**2.4313**	**12.4854**	**28.6903**	**0.0697**	**3.9172**	**0.1851**	**4.1024**	**1.0565**	**0.1703**	**1.2268**		**6,170.6230**	**6,170.6230**	**0.1722**		**6,174.2392**

3.4 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601		2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**		**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0524	0.0615	0.6711	1.5600e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		130.2798	130.2798	6.5300e-003		130.4169

Total	**0.0524**	**0.0615**	**0.6711**	**1.5600e-003**	**0.1232**	**9.2000e-004**	**0.1242**	**0.0327**	**8.5000e-004**	**0.0335**		**130.2798**	**130.2798**	**6.5300e-003**		**130.4169**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601	0.0000	2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**	**0.0000**	**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0524	0.0615	0.6711	1.5600e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		130.2798	130.2798	6.5300e-003		130.4169
Total	**0.0524**	**0.0615**	**0.6711**	**1.5600e-003**	**0.1232**	**9.2000e-004**	**0.1242**	**0.0327**	**8.5000e-004**	**0.0335**		**130.2798**	**130.2798**	**6.5300e-003**		**130.4169**

3.4 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**0.0477**	**0.0559**	**0.6070**	**1.5600e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**125.2526**	**125.2526**	**6.0400e-003**		**125.3794**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**0.0477**	**0.0559**	**0.6070**	**1.5600e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**125.2526**	**125.2526**	**6.0400e-003**		**125.3794**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**21.0901**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2587	0.3036	3.3106	7.7000e-003	0.6079	4.5600e-003	0.6125	0.1612	4.1900e-003	0.1654		642.7137	642.7137	0.0322		643.3899
Total	**0.2587**	**0.3036**	**3.3106**	**7.7000e-003**	**0.6079**	**4.5600e-003**	**0.6125**	**0.1612**	**4.1900e-003**	**0.1654**		**642.7137**	**642.7137**	**0.0322**		**643.3899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**21.0901**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2587	0.3036	3.3106	7.7000e-003	0.6079	4.5600e-003	0.6125	0.1612	4.1900e-003	0.1654		642.7137	642.7137	0.0322		643.3899
Total	**0.2587**	**0.3036**	**3.3106**	**7.7000e-003**	**0.6079**	**4.5600e-003**	**0.6125**	**0.1612**	**4.1900e-003**	**0.1654**		**642.7137**	**642.7137**	**0.0322**		**643.3899**

3.5 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**21.0540**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2351	0.2759	2.9943	7.7000e-003	0.6079	4.4200e-003	0.6123	0.1612	4.0800e-003	0.1653		617.9129	617.9129	0.0298		618.5386

Total	**0.2351**	**0.2759**	**2.9943**	**7.7000e-003**	**0.6079**	**4.4200e-003**	**0.6123**	**0.1612**	**4.0800e-003**	**0.1653**		**617.9129**	**617.9129**	**0.0298**		**618.5386**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**21.0540**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2351	0.2759	2.9943	7.7000e-003	0.6079	4.4200e-003	0.6123	0.1612	4.0800e-003	0.1653		617.9129	617.9129	0.0298		618.5386
Total	**0.2351**	**0.2759**	**2.9943**	**7.7000e-003**	**0.6079**	**4.4200e-003**	**0.6123**	**0.1612**	**4.0800e-003**	**0.1653**		**617.9129**	**617.9129**	**0.0298**		**618.5386**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Walkability Design

Integrate Below Market Rate Housing

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	53.9106	92.5469	449.5643	1.1081	73.4844	1.2961	74.7804	19.6159	1.1956	20.8115		87,709.0987	87,709.0987	3.4375		87,781.2857
Unmitigated	55.5365	101.1312	486.0095	1.2377	82.4740	1.4355	83.9095	22.0155	1.3242	23.3397		97,965.6002	97,965.6002	3.7946		98,045.2865

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	282.00	282.00	282.00	805,196	717,429
Condo/Townhouse	888.00	888.00	888.00	2,535,509	2,259,139
General Office Building	3,836.57	3,836.57	3836.57	9,168,447	8,169,086
Hotel	960.00	960.00	960.00	1,823,934	1,625,125
Movie Theater (No Matinee)	3,636.00	3,636.00	3636.00	6,846,578	6,100,301
Pharmacy/Drugstore w/o Drive Thru	1,350.00	1,350.00	1350.00	1,584,613	1,411,890
Regional Shopping Center	7,089.60	7,089.60	7089.60	12,430,230	11,075,335
Single Family Housing	840.00	840.00	840.00	2,398,455	2,137,023
Strip Mall	900.00	900.00	900.00	1,386,030	1,234,952
Total	19,782.17	19,782.17	19,782.17	38,978,990	34,730,280

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3

Condo/Townhouse	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Movie Theater (No Matinee)	9.50	7.30	7.30	1.80	79.20	19.00	66	17	17
Pharmacy/Drugstore w/o Drive	9.50	7.30	7.30	7.40	73.60	19.00	41	6	53
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Single Family Housing	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512639	0.073513	0.191470	0.131122	0.036200	0.005158	0.012615	0.022741	0.001866	0.002067	0.006563	0.000594	0.003452

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5732	5.1492	3.9227	0.0313		0.3961	0.3961		0.3961	0.3961		6,253.4626	6,253.4626	0.1199	0.1147	6,291.5201
NaturalGas Unmitigated	0.6505	5.8433	4.4521	0.0355		0.4494	0.4494		0.4494	0.4494		7,096.2855	7,096.2855	0.1360	0.1301	7,139.4723

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	4193.99	0.0452	0.3865	0.1645	2.4700e-003		0.0313	0.0313		0.0313	0.0313		493.4107	493.4107	9.4600e-003	9.0500e-003	496.4135
General Office Building	17069.6	0.1841	1.6735	1.4057	0.0100		0.1272	0.1272		0.1272	0.1272		2,008.1905	2,008.1905	0.0385	0.0368	2,020.4120
Hotel	29048	0.3133	2.8478	2.3922	0.0171		0.2164	0.2164		0.2164	0.2164		3,417.4066	3,417.4066	0.0655	0.0627	3,438.2044
Movie Theater (No Matinee)	1468.19	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109		172.7287	172.7287	3.3100e-003	3.1700e-003	173.7799
Pharmacy/Drugstore w/o Drive Thru	94.1096	1.0100e-003	9.2300e-003	7.7500e-003	6.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		11.0717	11.0717	2.1000e-004	2.0000e-004	11.1391
Regional Shopping Center	635.453	6.8500e-003	0.0623	0.0523	3.7000e-004		4.7300e-003	4.7300e-003		4.7300e-003	4.7300e-003		74.7592	74.7592	1.4300e-003	1.3700e-003	75.2142
Single Family Housing	6364.09	0.0686	0.5865	0.2496	3.7400e-003		0.0474	0.0474		0.0474	0.0474		748.7166	748.7166	0.0144	0.0137	753.2731
Strip Mall	56.4658	6.1000e-004	5.5400e-003	4.6500e-003	3.0000e-005		4.2000e-004	4.2000e-004		4.2000e-004	4.2000e-004		6.6430	6.6430	1.3000e-004	1.2000e-004	6.6835
Apartments Low Rise	1388.55	0.0150	0.1280	0.0545	8.2000e-004		0.0104	0.0104		0.0104	0.0104		163.3585	163.3585	3.1300e-003	2.9900e-003	164.3527
Total		**0.6505**	**5.8433**	**4.4520**	**0.0355**		**0.4494**	**0.4494**		**0.4494**	**0.4494**		**7,096.2855**	**7,096.2855**	**0.1360**	**0.1301**	**7,139.4723**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	3.70181	0.0399	0.3412	0.1452	2.1800e-003		0.0276	0.0276		0.0276	0.0276		435.5074	435.5074	8.3500e-003	7.9800e-003	438.1578
General Office Building	15.0205	0.1620	1.4726	1.2370	8.8400e-003		0.1119	0.1119		0.1119	0.1119		1,767.1217	1,767.1217	0.0339	0.0324	1,777.8761
Hotel	25.4856	0.2748	2.4986	2.0988	0.0150		0.1899	0.1899		0.1899	0.1899		2,998.3040	2,998.3040	0.0575	0.0550	3,016.5511

Movie Theater (No Matinee)	1.38339	0.0149	0.1356	0.1139	8.1000e-004		0.0103	0.0103		0.0103	0.0103		162.7518	162.7518	3.1200e-003	2.9800e-003	163.7423
Pharmacy/Drugstore w/o Drive Thru	0.0867123	9.4000e-004	8.5000e-003	7.1400e-003	5.0000e-005		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004		10.2015	10.2015	2.0000e-004	1.9000e-004	10.2635
Regional Shopping Center	0.585505	6.3100e-003	0.0574	0.0482	3.4000e-004		4.3600e-003	4.3600e-003		4.3600e-003	4.3600e-003		68.8829	68.8829	1.3200e-003	1.2600e-003	69.3021
Single Family Housing	5.61035	0.0605	0.5170	0.2200	3.3000e-003		0.0418	0.0418		0.0418	0.0418		660.0415	660.0415	0.0127	0.0121	664.0584
Strip Mall	0.0520274	5.6000e-004	5.1000e-003	4.2800e-003	3.0000e-005		3.9000e-004	3.9000e-004		3.9000e-004	3.9000e-004		6.1209	6.1209	1.2000e-004	1.1000e-004	6.1581
Apartments Low Rise	1.22851	0.0133	0.1132	0.0482	7.2000e-004		9.1500e-003	9.1500e-003		9.1500e-003	9.1500e-003		144.5311	144.5311	2.7700e-003	2.6500e-003	145.4107
Total		**0.5732**	**5.1492**	**3.9227**	**0.0313**		**0.3961**	**0.3961**		**0.3961**	**0.3961**		**6,253.4626**	**6,253.4626**	**0.1199**	**0.1146**	**6,291.5201**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Electric Lawnmower

Use Electric Leafblower

Use Electric Chainsaw

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	27.2246	0.2315	19.9878	1.0500e-003		0.2220	0.2220		0.2208	0.2208	0.0000	1,814.5761	1,814.5761	0.0692	0.0326	1,826.1392
Unmitigated	27.2335	0.2330	20.1336	1.0600e-003		0.2228	0.2228		0.2216	0.2216	0.0000	1,814.9017	1,814.9017	0.0697	0.0326	1,826.4756

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1111					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	20.3394					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1631	1.0000e-005	8.8900e-003	0.0000		0.1127	0.1127		0.1115	0.1115	0.0000	1,778.8235	1,778.8235	0.0341	0.0326	1,789.6492
Landscaping	0.6199	0.2330	20.1247	1.0600e-003		0.1102	0.1102		0.1102	0.1102		36.0781	36.0781	0.0356		36.8265
Total	**27.2335**	**0.2330**	**20.1336**	**1.0600e-003**		**0.2228**	**0.2228**		**0.2216**	**0.2216**	**0.0000**	**1,814.9017**	**1,814.9017**	**0.0697**	**0.0326**	**1,826.4756**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1111					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	20.3394					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1631	1.0000e-005	8.8900e-003	0.0000		0.1127	0.1127		0.1115	0.1115	0.0000	1,778.8235	1,778.8235	0.0341	0.0326	1,789.6492
Landscaping	0.6111	0.2315	19.9789	1.0500e-003		0.1093	0.1093		0.1093	0.1093		35.7525	35.7525	0.0351		36.4901
Total	**27.2246**	**0.2315**	**19.9878**	**1.0500e-003**		**0.2220**	**0.2220**		**0.2208**	**0.2208**	**0.0000**	**1,814.5761**	**1,814.5761**	**0.0692**	**0.0326**	**1,826.1392**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Merge 56 GHG Analysis

San Diego Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	296.26	1000sqft	6.80	296,263.00	0
Pharmacy/Drugstore w/o Drive Thru	15.00	1000sqft	0.34	15,000.00	0
Hotel	120.00	Room	4.00	174,240.00	0
Movie Theater (No Matinee)	45.45	1000sqft	1.04	45,453.00	0
Apartments Low Rise	47.00	Dwelling Unit	1.78	47,000.00	134
Condo/Townhouse	111.00	Dwelling Unit	4.22	111,000.00	317
Single Family Housing	84.00	Dwelling Unit	10.40	151,200.00	240
Regional Shopping Center	101.28	1000sqft	2.33	101,284.00	0
Strip Mall	9.00	1000sqft	0.21	9,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company					
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Construction Phase - Assuming painting and paving occur as phases are constructed

Area Coating - Rule 67.0.1 coatings

Table Name	Column Name	Default Value	New Value

tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	100
tblConstructionPhase	NumDays	35.00	296.00
tblConstructionPhase	NumDays	35.00	297.00
tblConstructionPhase	PhaseEndDate	5/10/2018	5/10/2017
tblConstructionPhase	PhaseEndDate	3/23/2018	3/22/2017
tblConstructionPhase	PhaseStartDate	3/23/2017	3/23/2016
tblConstructionPhase	PhaseStartDate	2/2/2017	2/2/2016
tblFireplaces	NumberGas	25.85	0.00
tblFireplaces	NumberGas	61.05	0.00
tblFireplaces	NumberGas	46.20	84.00
tblFireplaces	NumberNoFireplace	4.70	47.00
tblFireplaces	NumberNoFireplace	11.10	111.00
tblFireplaces	NumberNoFireplace	8.40	0.00
tblFireplaces	NumberWood	16.45	0.00
tblFireplaces	NumberWood	38.85	0.00
tblFireplaces	NumberWood	29.40	0.00
tblLandUse	LandUseSquareFeet	296,260.00	296,263.00
tblLandUse	LandUseSquareFeet	45,450.00	45,453.00
tblLandUse	LandUseSquareFeet	101,280.00	101,284.00
tblLandUse	LotAcreage	2.94	1.78
tblLandUse	LotAcreage	6.94	4.22
tblLandUse	LotAcreage	27.27	10.40

tblProjectCharacteristics	OperationalYear	2014	2019
tblVehicleTrips	ST_TR	7.16	6.00
tblVehicleTrips	ST_TR	7.16	8.00
tblVehicleTrips	ST_TR	2.37	12.95
tblVehicleTrips	ST_TR	8.19	8.00
tblVehicleTrips	ST_TR	90.06	90.00
tblVehicleTrips	ST_TR	49.97	70.00
tblVehicleTrips	ST_TR	10.08	10.00
tblVehicleTrips	ST_TR	42.04	100.00
tblVehicleTrips	SU_TR	6.07	6.00
tblVehicleTrips	SU_TR	6.07	8.00
tblVehicleTrips	SU_TR	0.98	12.95
tblVehicleTrips	SU_TR	5.95	8.00
tblVehicleTrips	SU_TR	90.06	90.00
tblVehicleTrips	SU_TR	25.24	70.00
tblVehicleTrips	SU_TR	8.77	10.00
tblVehicleTrips	SU_TR	20.43	100.00
tblVehicleTrips	WD_TR	6.59	6.00
tblVehicleTrips	WD_TR	6.59	8.00
tblVehicleTrips	WD_TR	11.01	12.95
tblVehicleTrips	WD_TR	8.17	8.00
tblVehicleTrips	WD_TR	90.06	90.00
tblVehicleTrips	WD_TR	42.94	70.00
tblVehicleTrips	WD_TR	9.57	10.00
tblVehicleTrips	WD_TR	44.32	100.00
tblWoodstoves	NumberCatalytic	2.35	0.00
tblWoodstoves	NumberCatalytic	5.55	0.00
tblWoodstoves	NumberCatalytic	4.20	0.00
tblWoodstoves	NumberNoncatalytic	2.35	0.00
tblWoodstoves	NumberNoncatalytic	5.55	0.00

tblWoodstoves	NumberNoncatalytic	4.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.9625	79.1481	57.7536	0.0942	8.8376	3.8035	12.6411	3.6401	3.4992	7.1393	0.0000	8,964.1373	8,964.1373	1.9459	0.0000	9,005.0001
2016	29.8715	68.0978	74.8131	0.1280	4.6483	3.6430	8.2913	1.2504	3.4057	4.6561	0.0000	12,120.7454	12,120.7454	1.6189	0.0000	12,154.7412
2017	29.0525	62.1765	71.2940	0.1280	4.6483	3.2851	7.9334	1.2504	3.0704	4.3208	0.0000	11,858.4693	11,858.4693	1.5870	0.0000	11,891.7958
Total	**65.8864**	**209.4225**	**203.8607**	**0.3502**	**18.1343**	**10.7315**	**28.8658**	**6.1409**	**9.9753**	**16.1161**	**0.0000**	**32,943.3519**	**32,943.3519**	**5.1517**	**0.0000**	**33,051.5372**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.9625	79.1481	57.7536	0.0942	8.8376	3.8035	12.6411	3.6401	3.4992	7.1393	0.0000	8,964.1373	8,964.1373	1.9459	0.0000	9,005.0001
2016	29.8715	68.0978	74.8131	0.1280	4.6483	3.6430	8.2913	1.2504	3.4057	4.6561	0.0000	12,120.7454	12,120.7454	1.6189	0.0000	12,154.7412
2017	29.0525	62.1765	71.2940	0.1280	4.6483	3.2851	7.9334	1.2504	3.0704	4.3208	0.0000	11,858.4693	11,858.4693	1.5870	0.0000	11,891.7958
Total	**65.8864**	**209.4225**	**203.8607**	**0.3502**	**18.1343**	**10.7315**	**28.8658**	**6.1409**	**9.9753**	**16.1161**	**0.0000**	**32,943.3519**	**32,943.3519**	**5.1517**	**0.0000**	**33,051.5372**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	27.2335	0.2330	20.1336	1.0600e-003		0.2228	0.2228		0.2216	0.2216	0.0000	1,814.9017	1,814.9017	0.0697	0.0326	1,826.4756
Energy	0.6505	5.8433	4.4521	0.0355		0.4494	0.4494		0.4494	0.4494		7,096.2855	7,096.2855	0.1360	0.1301	7,139.4723
Mobile	59.4238	107.2536	528.2253	1.1767	82.4740	1.4429	83.9169	22.0155	1.3310	23.3466		93,291.3810	93,291.3810	3.7988		93,371.1563
Total	**87.3077**	**113.3299**	**552.8110**	**1.2132**	**82.4740**	**2.1151**	**84.5892**	**22.0155**	**2.0021**	**24.0176**	**0.0000**	**102,202.5681**	**102,202.5681**	**4.0046**	**0.1627**	**102,337.1042**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	27.2246	0.2315	19.9878	1.0500e-003		0.2220	0.2220		0.2208	0.2208	0.0000	1,814.5761	1,814.5761	0.0692	0.0326	1,826.1392
Energy	0.5732	5.1492	3.9227	0.0313		0.3961	0.3961		0.3961	0.3961		6,253.4626	6,253.4626	0.1199	0.1147	6,291.5201
Mobile	57.8368	98.0939	494.7284	1.0538	73.4844	1.3035	74.7878	19.6159	1.2024	20.8183		83,530.2617	83,530.2617	3.4417		83,602.5377
Total	**85.6347**	**103.4746**	**518.6390**	**1.0861**	**73.4844**	**1.9215**	**75.4058**	**19.6159**	**1.8193**	**21.4351**	**0.0000**	**91,598.3003**	**91,598.3003**	**3.6308**	**0.1473**	**91,720.1970**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	1.92	8.70	6.18	10.48	10.90	9.16	10.86	10.90	9.13	10.75	0.00	10.38	10.38	9.33	9.50	10.37

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2015	3/4/2015	5	45	
2	Building Construction	Building Construction	3/5/2015	2/1/2017	5	500	
3	Paving	Paving	2/2/2016	3/22/2017	5	297	
4	Architectural Coating	Architectural Coating	3/23/2016	5/10/2017	5	296	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 626,130; Residential Outdoor: 208,710; Non-Residential Indoor: 961,860; Non-Residential Outdoor: 320,620

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	371.00	131.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	74.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980		6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**8.6733**	**3.8022**	**12.4755**	**3.5965**	**3.4980**	**7.0945**		**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0815	0.1015	0.9647	1.9600e-003	0.1643	1.2900e-003	0.1656	0.0436	1.1800e-003	0.0448		169.0541	169.0541	9.4300e-003		169.2522
Total	**0.0815**	**0.1015**	**0.9647**	**1.9600e-003**	**0.1643**	**1.2900e-003**	**0.1656**	**0.0436**	**1.1800e-003**	**0.0448**		**169.0541**	**169.0541**	**9.4300e-003**		**169.2522**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.7751	79.0467	50.8400	0.0618		3.8022	3.8022		3.4980	3.4980	0.0000	6,486.2433	6,486.2433	1.9364		6,526.9080
Total	**6.7751**	**79.0467**	**50.8400**	**0.0618**	**8.6733**	**3.8022**	**12.4755**	**3.5965**	**3.4980**	**7.0945**	**0.0000**	**6,486.2433**	**6,486.2433**	**1.9364**		**6,526.9080**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0815	0.1015	0.9647	1.9600e-003	0.1643	1.2900e-003	0.1656	0.0436	1.1800e-003	0.0448		169.0541	169.0541	9.4300e-003		169.2522
Total	**0.0815**	**0.1015**	**0.9647**	**1.9600e-003**	**0.1643**	**1.2900e-003**	**0.1656**	**0.0436**	**1.1800e-003**	**0.0448**		**169.0541**	**169.0541**	**9.4300e-003**		**169.2522**

3.3 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904		2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**		**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.7915	14.6433	21.1141	0.0311	0.8695	0.2369	1.1064	0.2481	0.2179	0.4659		3,138.6072	3,138.6072	0.0280		3,139.1957
Worker	1.5120	1.8822	17.8949	0.0363	3.0477	0.0239	3.0716	0.8084	0.0219	0.8303		3,135.9529	3,135.9529	0.1750		3,139.6282

Total	**3.3034**	**16.5255**	**39.0090**	**0.0674**	**3.9171**	**0.2609**	**4.1780**	**1.0564**	**0.2398**	**1.2962**		**6,274.5601**	**6,274.5601**	**0.2030**		**6,278.8239**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904	0.0000	2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**	**0.0000**	**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.7915	14.6433	21.1141	0.0311	0.8695	0.2369	1.1064	0.2481	0.2179	0.4659		3,138.6072	3,138.6072	0.0280		3,139.1957
Worker	1.5120	1.8822	17.8949	0.0363	3.0477	0.0239	3.0716	0.8084	0.0219	0.8303		3,135.9529	3,135.9529	0.1750		3,139.6282
Total	**3.3034**	**16.5255**	**39.0090**	**0.0674**	**3.9171**	**0.2609**	**4.1780**	**1.0564**	**0.2398**	**1.2962**		**6,274.5601**	**6,274.5601**	**0.2030**		**6,278.8239**

3.3 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.5809	12.7160	19.6122	0.0310	0.8695	0.1897	1.0592	0.2481	0.1745	0.4225		3,101.5457	3,101.5457	0.0248		3,102.0657
Worker	1.3747	1.7077	16.1246	0.0363	3.0477	0.0229	3.0706	0.8084	0.0210	0.8294		3,026.1410	3,026.1410	0.1615		3,029.5313
Total	**2.9556**	**14.4237**	**35.7368**	**0.0673**	**3.9172**	**0.2126**	**4.1298**	**1.0565**	**0.1955**	**1.2519**		**6,127.6866**	**6,127.6866**	**0.1862**		**6,131.5970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.5809	12.7160	19.6122	0.0310	0.8695	0.1897	1.0592	0.2481	0.1745	0.4225		3,101.5457	3,101.5457	0.0248		3,102.0657
Worker	1.3747	1.7077	16.1246	0.0363	3.0477	0.0229	3.0706	0.8084	0.0210	0.8294		3,026.1410	3,026.1410	0.1615		3,029.5313
Total	**2.9556**	**14.4237**	**35.7368**	**0.0673**	**3.9172**	**0.2126**	**4.1298**	**1.0565**	**0.1955**	**1.2519**		**6,127.6866**	**6,127.6866**	**0.1862**		**6,131.5970**

3.3 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.4445	11.3652	18.5759	0.0310	0.8696	0.1646	1.0342	0.2481	0.1514	0.3995		3,049.0756	3,049.0756	0.0235		3,049.5680
Worker	1.2454	1.5519	14.5124	0.0362	3.0477	0.0222	3.0698	0.8084	0.0204	0.8288		2,909.1896	2,909.1896	0.1494		2,912.3264
Total	**2.6900**	**12.9171**	**33.0883**	**0.0672**	**3.9172**	**0.1868**	**4.1040**	**1.0565**	**0.1718**	**1.2283**		**5,958.2653**	**5,958.2653**	**0.1728**		**5,961.8945**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	1.4445	11.3652	18.5759	0.0310	0.8696	0.1646	1.0342	0.2481	0.1514	0.3995		3,049.0756	3,049.0756	0.0235		3,049.5680
Worker	1.2454	1.5519	14.5124	0.0362	3.0477	0.0222	3.0698	0.8084	0.0204	0.8288		2,909.1896	2,909.1896	0.1494		2,912.3264
Total	**2.6900**	**12.9171**	**33.0883**	**0.0672**	**3.9172**	**0.1868**	**4.1040**	**1.0565**	**0.1718**	**1.2283**		**5,958.2653**	**5,958.2653**	**0.1728**		**5,961.8945**

3.4 Paving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601		2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**		**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0690	0.6519	1.4700e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		122.3507	122.3507	6.5300e-003		122.4878

Total	**0.0556**	**0.0690**	**0.6519**	**1.4700e-003**	**0.1232**	**9.2000e-004**	**0.1242**	**0.0327**	**8.5000e-004**	**0.0335**		**122.3507**	**122.3507**	**6.5300e-003**		**122.4878**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601	0.0000	2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**	**0.0000**	**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0690	0.6519	1.4700e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		122.3507	122.3507	6.5300e-003		122.4878
Total	**0.0556**	**0.0690**	**0.6519**	**1.4700e-003**	**0.1232**	**9.2000e-004**	**0.1242**	**0.0327**	**8.5000e-004**	**0.0335**		**122.3507**	**122.3507**	**6.5300e-003**		**122.4878**

3.4 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**0.0504**	**0.0628**	**0.5868**	**1.4700e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**117.6222**	**117.6222**	**6.0400e-003**		**117.7491**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**0.0504**	**0.0628**	**0.5868**	**1.4700e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**117.6222**	**117.6222**	**6.0400e-003**		**117.7491**

3.5 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966		281.4481	281.4481	0.0332		282.1449
Total	**21.0901**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**		**281.4481**	**281.4481**	**0.0332**		**282.1449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2742	0.3406	3.2162	7.2300e-003	0.6079	4.5600e-003	0.6125	0.1612	4.1900e-003	0.1654		603.5969	603.5969	0.0322		604.2731
Total	**0.2742**	**0.3406**	**3.2162**	**7.2300e-003**	**0.6079**	**4.5600e-003**	**0.6125**	**0.1612**	**4.1900e-003**	**0.1654**		**603.5969**	**603.5969**	**0.0322**		**604.2731**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3685	2.3722	1.8839	2.9700e-003		0.1966	0.1966		0.1966	0.1966	0.0000	281.4481	281.4481	0.0332		282.1449
Total	**21.0901**	**2.3722**	**1.8839**	**2.9700e-003**		**0.1966**	**0.1966**		**0.1966**	**0.1966**	**0.0000**	**281.4481**	**281.4481**	**0.0332**		**282.1449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2742	0.3406	3.2162	7.2300e-003	0.6079	4.5600e-003	0.6125	0.1612	4.1900e-003	0.1654		603.5969	603.5969	0.0322		604.2731
Total	**0.2742**	**0.3406**	**3.2162**	**7.2300e-003**	**0.6079**	**4.5600e-003**	**0.6125**	**0.1612**	**4.1900e-003**	**0.1654**		**603.5969**	**603.5969**	**0.0322**		**604.2731**

3.5 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**21.0540**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2484	0.3096	2.8947	7.2300e-003	0.6079	4.4200e-003	0.6123	0.1612	4.0800e-003	0.1653		580.2696	580.2696	0.0298		580.8953

Total	**0.2484**	**0.3096**	**2.8947**	**7.2300e-003**	**0.6079**	**4.4200e-003**	**0.6123**	**0.1612**	**4.0800e-003**	**0.1653**		**580.2696**	**580.2696**	**0.0298**		**580.8953**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.7217					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**21.0540**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2484	0.3096	2.8947	7.2300e-003	0.6079	4.4200e-003	0.6123	0.1612	4.0800e-003	0.1653		580.2696	580.2696	0.0298		580.8953
Total	**0.2484**	**0.3096**	**2.8947**	**7.2300e-003**	**0.6079**	**4.4200e-003**	**0.6123**	**0.1612**	**4.0800e-003**	**0.1653**		**580.2696**	**580.2696**	**0.0298**		**580.8953**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Walkability Design

Integrate Below Market Rate Housing

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	57.8368	98.0939	494.7284	1.0538	73.4844	1.3035	74.7878	19.6159	1.2024	20.8183		83,530.2617	83,530.2617	3.4417		83,602.5377
Unmitigated	59.4238	107.2536	528.2253	1.1767	82.4740	1.4429	83.9169	22.0155	1.3310	23.3466		93,291.3810	93,291.3810	3.7988		93,371.1563

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	282.00	282.00	282.00	805,196	717,429
Condo/Townhouse	888.00	888.00	888.00	2,535,509	2,259,139
General Office Building	3,836.57	3,836.57	3836.57	9,168,447	8,169,086
Hotel	960.00	960.00	960.00	1,823,934	1,625,125
Movie Theater (No Matinee)	3,636.00	3,636.00	3636.00	6,846,578	6,100,301
Pharmacy/Drugstore w/o Drive Thru	1,350.00	1,350.00	1350.00	1,584,613	1,411,890
Regional Shopping Center	7,089.60	7,089.60	7089.60	12,430,230	11,075,335
Single Family Housing	840.00	840.00	840.00	2,398,455	2,137,023
Strip Mall	900.00	900.00	900.00	1,386,030	1,234,952
Total	19,782.17	19,782.17	19,782.17	38,978,990	34,730,280

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3

Condo/Townhouse	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Movie Theater (No Matinee)	9.50	7.30	7.30	1.80	79.20	19.00	66	17	17
Pharmacy/Drugstore w/o Drive	9.50	7.30	7.30	7.40	73.60	19.00	41	6	53
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Single Family Housing	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512639	0.073513	0.191470	0.131122	0.036200	0.005158	0.012615	0.022741	0.001866	0.002067	0.006563	0.000594	0.003452

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5732	5.1492	3.9227	0.0313		0.3961	0.3961		0.3961	0.3961		6,253.4626	6,253.4626	0.1199	0.1147	6,291.5201
NaturalGas Unmitigated	0.6505	5.8433	4.4521	0.0355		0.4494	0.4494		0.4494	0.4494		7,096.2855	7,096.2855	0.1360	0.1301	7,139.4723

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	4193.99	0.0452	0.3865	0.1645	2.4700e-003		0.0313	0.0313		0.0313	0.0313		493.4107	493.4107	9.4600e-003	9.0500e-003	496.4135
General Office Building	17069.6	0.1841	1.6735	1.4057	0.0100		0.1272	0.1272		0.1272	0.1272		2,008.1905	2,008.1905	0.0385	0.0368	2,020.4120
Hotel	29048	0.3133	2.8478	2.3922	0.0171		0.2164	0.2164		0.2164	0.2164		3,417.4066	3,417.4066	0.0655	0.0627	3,438.2044
Movie Theater (No Matinee)	1468.19	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109		172.7287	172.7287	3.3100e-003	3.1700e-003	173.7799
Pharmacy/Drugstore w/o Drive Thru	94.1096	1.0100e-003	9.2300e-003	7.7500e-003	6.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		11.0717	11.0717	2.1000e-004	2.0000e-004	11.1391
Regional Shopping Center	635.453	6.8500e-003	0.0623	0.0523	3.7000e-004		4.7300e-003	4.7300e-003		4.7300e-003	4.7300e-003		74.7592	74.7592	1.4300e-003	1.3700e-003	75.2142
Single Family Housing	6364.09	0.0686	0.5865	0.2496	3.7400e-003		0.0474	0.0474		0.0474	0.0474		748.7166	748.7166	0.0144	0.0137	753.2731
Strip Mall	56.4658	6.1000e-004	5.5400e-003	4.6500e-003	3.0000e-005		4.2000e-004	4.2000e-004		4.2000e-004	4.2000e-004		6.6430	6.6430	1.3000e-004	1.2000e-004	6.6835
Apartments Low Rise	1388.55	0.0150	0.1280	0.0545	8.2000e-004		0.0104	0.0104		0.0104	0.0104		163.3585	163.3585	3.1300e-003	2.9900e-003	164.3527
Total		**0.6505**	**5.8433**	**4.4520**	**0.0355**		**0.4494**	**0.4494**		**0.4494**	**0.4494**		**7,096.2855**	**7,096.2855**	**0.1360**	**0.1301**	**7,139.4723**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	3.70181	0.0399	0.3412	0.1452	2.1800e-003		0.0276	0.0276		0.0276	0.0276		435.5074	435.5074	8.3500e-003	7.9800e-003	438.1578
General Office Building	15.0205	0.1620	1.4726	1.2370	8.8400e-003		0.1119	0.1119		0.1119	0.1119		1,767.1217	1,767.1217	0.0339	0.0324	1,777.8761
Hotel	25.4856	0.2748	2.4986	2.0988	0.0150		0.1899	0.1899		0.1899	0.1899		2,998.3040	2,998.3040	0.0575	0.0550	3,016.5511

Movie Theater (No Matinee)	1.38339	0.0149	0.1356	0.1139	8.1000e-004		0.0103	0.0103		0.0103	0.0103		162.7518	162.7518	3.1200e-003	2.9800e-003	163.7423
Pharmacy/Drugstore w/o Drive Thru	0.0867123	9.4000e-004	8.5000e-003	7.1400e-003	5.0000e-005		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004		10.2015	10.2015	2.0000e-004	1.9000e-004	10.2635
Regional Shopping Center	0.585505	6.3100e-003	0.0574	0.0482	3.4000e-004		4.3600e-003	4.3600e-003		4.3600e-003	4.3600e-003		68.8829	68.8829	1.3200e-003	1.2600e-003	69.3021
Single Family Housing	5.61035	0.0605	0.5170	0.2200	3.3000e-003		0.0418	0.0418		0.0418	0.0418		660.0415	660.0415	0.0127	0.0121	664.0584
Strip Mall	0.0520274	5.6000e-004	5.1000e-003	4.2800e-003	3.0000e-005		3.9000e-004	3.9000e-004		3.9000e-004	3.9000e-004		6.1209	6.1209	1.2000e-004	1.1000e-004	6.1581
Apartments Low Rise	1.22851	0.0133	0.1132	0.0482	7.2000e-004		9.1500e-003	9.1500e-003		9.1500e-003	9.1500e-003		144.5311	144.5311	2.7700e-003	2.6500e-003	145.4107
Total		**0.5732**	**5.1492**	**3.9227**	**0.0313**		**0.3961**	**0.3961**		**0.3961**	**0.3961**		**6,253.4626**	**6,253.4626**	**0.1199**	**0.1146**	**6,291.5201**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Electric Lawnmower

Use Electric Leafblower

Use Electric Chainsaw

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	27.2246	0.2315	19.9878	1.0500e-003		0.2220	0.2220		0.2208	0.2208	0.0000	1,814.5761	1,814.5761	0.0692	0.0326	1,826.1392
Unmitigated	27.2335	0.2330	20.1336	1.0600e-003		0.2228	0.2228		0.2216	0.2216	0.0000	1,814.9017	1,814.9017	0.0697	0.0326	1,826.4756

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1111					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	20.3394					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1631	1.0000e-005	8.8900e-003	0.0000		0.1127	0.1127		0.1115	0.1115	0.0000	1,778.8235	1,778.8235	0.0341	0.0326	1,789.6492
Landscaping	0.6199	0.2330	20.1247	1.0600e-003		0.1102	0.1102		0.1102	0.1102		36.0781	36.0781	0.0356		36.8265
Total	**27.2335**	**0.2330**	**20.1336**	**1.0600e-003**		**0.2228**	**0.2228**		**0.2216**	**0.2216**	**0.0000**	**1,814.9017**	**1,814.9017**	**0.0697**	**0.0326**	**1,826.4756**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	6.1111					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	20.3394					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.1631	1.0000e-005	8.8900e-003	0.0000		0.1127	0.1127		0.1115	0.1115	0.0000	1,778.8235	1,778.8235	0.0341	0.0326	1,789.6492
Landscaping	0.6111	0.2315	19.9789	1.0500e-003		0.1093	0.1093		0.1093	0.1093		35.7525	35.7525	0.0351		36.4901
Total	**27.2246**	**0.2315**	**19.9878**	**1.0500e-003**		**0.2220**	**0.2220**		**0.2208**	**0.2208**	**0.0000**	**1,814.5761**	**1,814.5761**	**0.0692**	**0.0326**	**1,826.1392**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation